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ABSTRACT

The Online Books Evaluation Project at Columbia University (New York) explores the potential for online books to become significant resources in academic libraries. The Project confronts and explores a set of feasibility issues, including publishers' ability to provide books of various types and vintages in forms conducive to conversion to online formats and the ability to convert them to online books that will serve users' needs and preferences. This paper focuses on the first of the Project's elements, user response, and reports on: (1) the conceptual framework of the Project; (2) background information on the status of the collection and other relevant Project elements, particularly design considerations; (3) methodology for measuring adoption of online books by the Columbia community; (4) current findings on relevant environmental factors, including access to online resources; (5) current findings on use of online books and other online resources; and (6) current findings on attitudes toward online books. This paper also reflects the experiences of the Project as a case study, specifically, the problems encountered evaluating online resources and problems encountered in producing online books. Fifty-nine tables present statistics. (Contains 47 references.) (AEF)

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Scholarly Communication and Technology

ED 414 930

Conference Organized by The Andrew W. Mellon Foundation

at Emory University
April 24-25, 1997

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Session #4 Patterns of Usage

Online Books at Columbia: Measurement and Early Results on Use, Satisfaction, and Effect

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ONLINE BOOKS AT COLUMBIA

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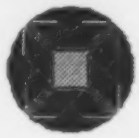

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1. EXECUTIVE SUMMARY

The Online Books Evaluation Project at Columbia University explores the potential for online books to become significant resources in academic libraries by analyzing (1) the Columbia community's adoption of and reaction to various online books and delivery system features provided by the Libraries over the period of the Project; (2) the relative life cycle costs of producing, owning and using online books and their print counterparts; and (3) the implications of intellectual property regulations and traditions of scholarly communications and publishing for the online format.

Online books might enhance the scholarly processes of research, dissemination of findings, teaching, and learning. Alternatively, or in addition, they might enable publishers, libraries and scholars to reduce the costs of disseminating and using scholarship. For example:

- If the scholarly community were prepared to use some or all categories of books for some or all purposes in an online format instead of a print format, publishers, libraries and bookstores might be able to trim costs as well as enhance access to these books.

- If online books made scholars significantly more efficient or effective in their work of research, teaching and learning so as to enhance revenues or reduce operating costs for institutions of scholarship, these books might be worth adopting even if their costs were no lower than those for their print counterparts.

- If an online format became standard, publishers might be able to offer affordable online access to books to institutions which would not normally have purchased print copies, thus both expanding convenient access to scholarship to members of those institutions and expanding publishers' revenues from these books.

The Columbia Online Books Evaluation Project is designed to learn about the scholarly community's enthusiasm for the online format in the near term and about features that users will demand, to project likely adoption patterns, and to estimate gains in operating effectiveness, revenue, and cost, if any, to be realized by publishers, funders of scholarship, libraries, and scholars. The Project confronts and explores a set of feasibility issues, including publishers' ability to provide books of various types and vintages in forms conducive to conversion to online formats and our ability to convert them to online books that will serve users' needs and preferences.

This paper focuses on the first of the Project's elements, user response, and reports on:

1. the conceptual framework for the Project; (Section 2)

2. background information on the status of the collection and other relevant Project elements; particularly design considerations; (Section 3)

3. our methodology for measuring adoption of online books by the Columbia community; (Section 4.1)

4. our current findings on relevant environmental factors, including access to online resources; (Section 4.2)

5. our current findings on use of online books and other online resources; (Section 4.3, 5.2)

6. our current findings on attitudes toward online books. (Sections 6 and 7)

The paper also reflects on our experience as a case study, specifically (1) problems encountered evaluating online resources (Section 6), and (2) problems encountered in producing online books (Section 3.2). The Project began in early 1995 with three reference works online; in autumn 1996 the first modern monographs became available to the Columbia University community which is the focus of the study.

Our current findings may be summarized as follows:

- *Most if not all reference books are used more heavily online than in print.* (Section 4.3.1)

- *Early online reference books have experienced falling usage over time, substitution of use of a new delivery system for an old one, or a smaller rate of growth of use than might be expected given the explosion in access to and use of online resources in general.* (Section 4.3.1)

In the early to mid-1990s, the novelty of online books may have brought users to the format somewhat without concern for their design, the utility of the delivery system, or the qualities of the books. With enhancement in delivery systems and expansion in the number of online books, being online is no longer a guarantee that a book will be used. New graphical delivery systems offer superior performance that is likely to draw scholars away from these early online resources provided via text-based systems increasingly, as access to those new delivery systems spreads. In addition, as more competing resources come online and either provide information that serves the immediate needs of a user better or offers a more attractive, user friendly format, scholars are less likely to find or to choose to use any single resource.

- *Online scholarly monographs are available to and used by more people than their print counterparts in the library collection.* (Section 4.3.2) Once a print book is in circulation, it is effectively unavailable to others for hours in the Reserve collection and weeks or months in the regular collection. An online book is always available to any potential user who has access to a computer with a Web browser.

- *Being online may bring to a book scholars who would not have seen it otherwise.* (Section 4.3.2) However, it is not yet clear whether their productivity or work quality will be significantly enhanced by such serendipity. The important concept of collation is transformed, in the networked environment, to a diversity of finding and navigational systems. As the online collection grows, browsing will require the focused use of online search tools rather than use of project-oriented Web pages.

- *Data from the most recent 11 weeks, including the last half of the spring 1997 semester, suggest that when a social work book available in both print and online formats was used in a course, the share of students using the online version was at most one-quarter.* (Section 4.3.4) We will track this rate of penetration for social work and other disciplines over the next semesters to see if students increase their rate of adoption.

- *Some scholars, especially students in a course assigned a reading that is in the online collection, are looking at the online books in some depth, suggesting that they find value in this means of access.* (Section 4.3.4) For example, in the most recent 11 weeks

analyzed, the two most frequently used monographs averaged 9.6 and 7.7 hits (chapters) per unique user.

- *Scholars residing off-campus are not using the online books from their homes to a significant degree.* (Section 4.3.2.2) For the ten months from May 1996, only 11 percent of the hits on Columbia University Press monographs were dial-up connections. Scholars report (in our interviews) that the expense of dialing-in to campus or maintaining an Internet account, the lack of sufficiently powerful home computers and Web software, and the slowness of delivery of the Web over standard modems are key constraining factors.

- *Students residing on campus may have Ethernet connections to the campus network - providing both speedy and virtually free access to the online collection. They are using online books, especially reference works, from their dorms during hours when the libraries are not open.* Forty-two percent of the hits on *The Oxford English Dictionary* in the ten months from May 1996 were from computers with such residence hall connections. (Section 4.3.1.2)

- *Some scholars perceive gains in the productivity and quality of their work in using online books, particularly reference books. Over half the respondents to our online survey (a small number) see the productivity and quality of their work using online resources to be as good or better than that achieved using paper resources.* (Section 6.2.11)

- *In surveys and interviews, students report that they particularly value easy access to the texts that are assigned for class and an ability to underline and annotate those texts. Students seek the ability to print out all or parts of the online texts that they are using for their courses, again indicating their desire to have the paper copy to use in their studying. Computer access to a needed text is not equivalent to having a paper copy (whole book or assigned portion) in one's backpack, available at any time and at any place.* (Section 5.2.4)

If the effective choice is between borrowing a book from the library, probably on a very short term basis from Reserves, and accessing the book online, the student is facing a parallel situation of needing to photocopy or print out to obtain portable, annotatable media. However, the online book has the advantages of never being checked out when one wants to use it and of being accessible from a computer anywhere in the world at any time (as long as that computer has an Internet connection and a browser).

- *In surveys and interviews we find that scholars value the ability to do searches, to browse, and to look up information in an online book quickly. They also like the ability to clip bits of the text and put them in an electronic research notes file. Willingness to browse and to read online for extended periods varies from person to person, but it does not seem to be widespread at this time.*

- *Scholars with easy access to a networked computer spend more time online and are more likely to prefer to use one of the forms of the online book.* (Section 7) This suggests that, over time as such access achieves greater penetration in the scholarly community, online books will be achieve greater acceptance.

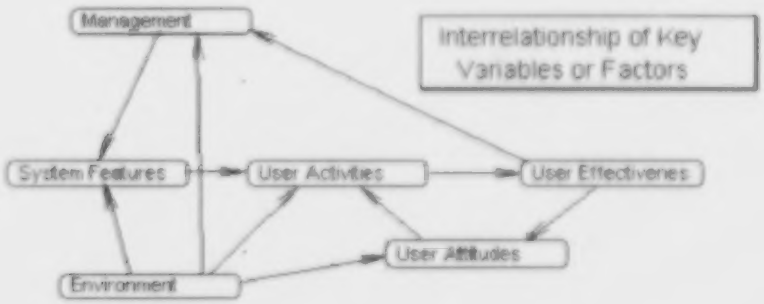
- *In the most recent 11 weeks studied, 52 percent of the online book users who viewed our online survey responded to it, but only 15 percent of these users chose to click on the button taking them to the survey.* (Section 6.2.14) Designing an online survey that is available to the reader without his taking action might enhance the response rate significantly.

2. CONCEPTUAL FRAMEWORK

The variables representing usage of a system of scholarly communication and research are at the same time effects and causes. Since scholars, the users of the system, are highly intelligent and adaptive, the effect of the system will influence their behavior, establishing a kind of feedback loop. As the diagram in Figure 1 shows, there are two key loops. The upper one, shown by the dark arrows, reflects an idealized picture of university administration. In this picture, the features of any system are adjusted so that, when used by faculty and students, they improve institutional effectiveness. This occurs in the context of continual adaptation on the part of the users of the system, as shown by the lighter colored arrows in the lower feedback loop.

All of this is constrained by the continual change of the environment, which affects the expectations and activities of the users, affects the kind of features that can be built into the system, and affects the very management that is bringing the system into existence. This interaction is shown by the dotted arrows in Figure 1.

Figure 1. Interrelation of Factors Involved in the Use and Impact of Online Books.



Our primary research goal, in relation to users, uses, and impacts, is to understand these relationships, using data gathered by library circulation systems, Internet servers, and surveys and interviews of users themselves.

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3. THE ONLINE BOOKS COLLECTION

The Online Books Evaluation Project began formal activity in January 1995. However, discussions with publishers about cooperating in such an effort by providing books and collaborating in research began in 1993, if not earlier. As noted in the Project's *Analytical Principles and Design* document, "The Online Books Evaluation Project is a component of the developing digital library at Columbia University. As part of its digital library effort, the Columbia University Libraries is acquiring a variety of reference and monographic books in electronic format to be included on the campus network; in most cases, those books will be available only to members of the Columbia community. Some of the books are being purchased; others are being provided on a pilot project basis by publishers who are seeking to understand how the academic community will use online books if they become more widely available in the future."

Columbia University Libraries provides the Columbia community with access to a substantial and growing set of full text (journals and reference materials), image, data and bibliographic online resources in addition to those that we are studying in the Online Books Evaluation Project. Some have been acquired or developed at Columbia and are maintained on servers here, e.g., art images, working papers. Others are maintained by publishers with access licensed to Columbia, e.g., *Encyclopedia Britannica* and Gale's *Contemporary Authors* and *Encyclopedia of Associations*. Yet others are maintained elsewhere and access is free to all, with Columbia subject specialists providing links on their subject home pages.

3.1 Design Of the Online Books Collection

When this Project was proposed, the World Wide Web was an emerging technology, and we still expected to develop specialized browsers for using the books in SGML format, just as other online projects were doing at the time. However, by the time the Project was funded and ready to mount books online, it was clear that the Web would soon be the best delivery system for maximizing availability of the books to the scholarly community. Web browsers had, and still have, annoying limitations, but we felt that they would become better over time and provide optimum flexibility to users.

Many other online projects are providing users with materials in PDF, scanned, or bitmapped format. These are effective formats for journal articles, which are finely indexed through existing sources and which are short and easily printed. However, the greatest potential added value from online books, compared to their print counterparts, comes with truly digital books. Only in this type of format, for example, can users do full search for terms or cut and paste parts of the book to another document. In addition, only this online format allows the development of truly interactive books that take advantage of the current and anticipated capabilities of Web technology, such as the inclusion of sound and video, data files and software for manipulating data, and links to other online resources. Perhaps only such enhanced online books will offer sufficient advantages over traditional print format that scholars will be willing to substitute them for the print format for any or all of their modes of use and for any or all classes of books.

We have devoted considerable time and effort over the past two years to dealing with technical and design issues for the books. The design has evolved over this period as Web technology has advanced and as the Project team and users have reacted to early decisions. We will continue to work with users over the months ahead in order to provide basic design features that they endorse. We hope to begin to introduce more interactive features as appropriate to various books and to measure user response to them.

We look forward to comparing the results of our evaluations with those of online projects using other formats to explore whether format does make a significant difference in user attitudes and behavior.

3.2 Development of the Online Books Collection

3.2.1 Purchased Texts

Purchased texts included in the Online Books collection are *The Oxford English Dictionary* and classical texts in social thought from InteLex's *Past Masters* CD-ROM. Columbia converted the *Past Masters* texts from SGML to HTML for Web access. Ten *Past Masters* texts were made available to the Columbia community online in mid-1995, although with little publicity. Another 44 went online in July 1996, with publicity for the collection beginning early in the Fall. We intend to convert several other purchased CD-ROM products, largely literary texts, and include them in the collection in the near future. The Columbia digital library provides access to many other full text works to the scholarly community, but the ones described here have been the focus of our analysis, in large part because they are mounted on local servers from which detailed usage information can be gathered.

3.2.2 Collaborating Publishers And Their Books

Publishers participating in the Project by providing electronic files for their books and collaborating in the research effort are Columbia University Press, Garland Publishing, Oxford University Press, and Simon and Schuster Higher Education. All but Garland have been involved in this Project since its inception; Garland jointed the effort in 1996. The books provided by each publisher and the timing of the introduction of those books to the online collection are as follows:

Columbia University Press: Two reference works, *The Columbia Granger's Index to Poetry* and *The Concise Columbia Electronic Encyclopedia*, have been available since the outset. Columbia will provide three more reference books - *The Columbia Electronic Encyclopedia*, *The Columbia Guide to Standard American Usage*, and *The Columbia World of Quotations* - in 1997. Monographs, anthologies and textbooks are being provided in the fields of social work, literary criticism, political science, and earth and environmental science. The Project includes only books for which the Press can obtain both electronic files and author permissions. Sixteen such books are now in the collection, seven of them in the field of social work. The first of these books were made available online in September 1996. At this point, it appears that 27 more CUP books published in these fields in the past three years will be available to our collection; they will be added in the next few months.

Garland Publishing: Three Garland reference works, *The Chaucer Name Dictionary*, *Native American Women: A Biographical Dictionary*, and *African American Women: A Biographical Dictionary*, were added to the collection from December 1996 through February 1997. We selected these books because Columbia has sizable user groups in Medieval and Women's Studies and because they were available in electronic format and amenable to conversion to HTML. Garland is reviewing its collection and its resource availability to determine whether it can provide any other books to the Project.

Oxford University Press: In 1995, Oxford agreed to provide its monographs in the fields of literary criticism, neuroscience, and philosophy from the publication lists for 1995 through 1997. Oxford reports that a substantial share of titles in these fields have low sales and, hence, represent *the endangered scholarly monograph.* As of early 1996, Oxford had provided electronic files for 19 monographs in the fields of literary criticism and philosophy. Oxford required the Project to provide an online ordering mechanism concurrent with the availability of its books; that ordering system was ready for use in October. Sixteen Oxford books were online by year end 1996; 17 are now online. In June 1997, Oxford provided nine more books in literary criticism and philosophy. These should be online by fall 1997.

Simon and Schuster Higher Education: By late 1994, Simon and Schuster had agreed to contribute high use titles, defined as books on reserve for Columbia courses that had relatively heavy circulation. Simon and Schuster provided electronic files for nine such books, most of them in business-related subjects, in Fall 1995. As of June 1997, two of the books were online and the others were expected to be ready before the new academic year.

3.2.3 The Challenge of Obtaining Electronic Files for Books from Publishers

The Project's 1997 Annual Report discusses publishers' difficulty in providing electronic files for books that are amenable to conversion to the HTML format being used in the Project. Those problems include:

- Neither the publishers nor their printers have ready access to the final electronic files, e.g., typesetter's tapes, for books unless specific provision has been made for systematic retention and archiving of such files. Most publishers have not been able routinely to provide the Project with copies of the electronic files for books published since the early to mid-1990s.
- The electronic files for some books contain so many special characters and graphics that conversion to HTML format is infeasible.
- Publishers never possessed electronic files for books that authors supplied as camera-ready copy.
- After publication, seeking permissions from multiple copyright owners involved in a book, such as a collection of essays, would be too onerous.
- Interviews with authors reveal that those who refuse to include their books in the Project do so for various reasons. Some fear the ease of downloading and printing Web materials will tempt users not to respect copyright and that scholars outside of the Columbia community will receive copies of their works, thus reducing their royalty income. Others oppose the concept of online books and do not want to encourage them.

3.3 User Access to the Collection

3.3.1 Formats and Functionalities Over Time

As of June 1997, the Columbia community had access to a total of 96 online texts that are part of the Online Books Project. The Libraries have each book in print form, circulating from the regular collection or Reserves, or non-circulating in Reference, as well as in one or more online formats. Appendix 1 summarizes the print access modes for all the modern books in the collection. The various online modes have differing functionalities beyond browsing or reading on screen. Appendix 2 summarizes the schedule of mounting for the online books and their functionalities.

3.3.2 Who Can Use The Collection

By agreement with the publishers, we restrict access to the Project's online books to members of the Columbia University community, i.e., faculty, staff and students of Columbia and affiliated institutions who use the books in the Libraries and from anywhere via network access. Until March 1997, books were also available, only on Libraries terminals, to alumni and others with reading privileges. This policy both protects the publishers' intellectual property and provides the Project with the ability to gather richer data on usage.

Through Winter 1997: We employed two methods through Winter 1997 to maintain this control of access.

- To use books on CNet or at the Unix prompt, a scholar must sign in with her Columbia email address and password. This remains the case for this set of books. The exception to this rule is the public CNet terminals.

- To access books on CWeb, a scholar was required to use a computer with an address that the server recognizes as Columbia affiliated. Members of the Columbia community who connected to CWeb from a service like AOL were not able to use the collection. On the other hand, guests using X-terminals on the Columbia campus could reach those books.

In both cases, the data the server logs did not include information on the user. We initially planned to develop a directory of Columbia IP addresses by location and to link it to the server data in order to make general discrimination between dormitories and various other campus buildings. However, we decided that developing and maintaining this database would be too costly, given our near term plans for individual user authentication. Instead our analyses for the period before mid-March 1997 result from deduction based on the host name of the user computer.

As of March 15, 1997: For books in this Project and other materials with user restrictions, Columbia has developed and deployed a more robust system for Web authentication and access. This system permits a member of the Columbia community to use materials even if she connects through an Internet service provider like AOL. It requires each user to sign in when he wants to use one or more items in the collection. During a session, he needs to sign in only once. Ultimately, data records will be session based, that is linking all the activities by a user in a single session within its umbrella into a single record and providing information on the identity of that user.

Future: Given that Web browser/server interaction are *stateless*, i.e., each transaction is essentially independent of previous ones and the server retains no memory of a user's previous actions, translating the ability to control access to resources to the Web has been a challenge.

This local authorization system manages access with information from the central authentication database. This session-based system supports more extensive analysis of usage patterns. In particular, usage statistics can be tied to user characteristics. The management statistics system that will link access to a book with information on the user's affiliations and status should be fully ready this summer. In particular, transaction statistics may be aggregated for individuals, based on their initial 'login', providing more continuous, 'session based' tracking. To protect privacy, the personal key will be retained long enough to look up the required demographic information and will then be retained in encrypted form, to serve as an anonymous unique identification code.

3.3.3 Access Paths to CWeb Books

Users have six main alternatives for learning of the CWeb books: (1) word of mouth; : (2) the online catalog; (3) the Libraries' Digital Collections Web page; (4) the Project's home page; (5) Web pages for specialized library collections; and (6) publicity flyers, email messages, and formal and informal presentations by librarians and Project staff directed at the faculty and students most likely to be interested in the various online book collections.

In CLIO, the online catalog, a record for each online book lists its Web address (URL). In the near future when CLIO moves to the Web, a scholar will be able to click on that URL in the CLIO record and proceed directly to the book. During the period covered by this report, however, in order to move from that CLIO record to the online book, the scholar must either copy or write out the URL, switch to the Web, and input the URL into the Location box.

The first CWeb access point for the monographic (non-reference) books is a set of links to the Web pages with the subject categories into which we have grouped the books and another link to an alphabetical listing by author of all the texts in the collection. These links are on the Libraries' Digital Collections home page at http://www.columbia.edu/cu/libraries/digital/. (See Exhibit 1.)

Exhibit 1. Columbia University Digital Library Collections

http://www.columbia.edu/cu/libraries/digital/

A scholar starting at the Columbia University Web home page must take two steps to reach that list (to *Libraries*, to *Digital Collections*).

During Fall 1996 and Winter 1997, we sought ways to focus user attention on the collection, in the hopes of achieving more use and feedback. At the end of 1996, we launched a new Project home page (http://www.columbia.edu/dlc/olb/); see Exhibit 2. This page has a brief description of the evaluation effort, a link to the page that includes copies of the Project documents, a button for comments about the design of the online books system, a button for sending email to the Project Coordinator, and a capability to search by keyword throughout the books in the collection. In addition, it has links to groups of books in the collection: *Historical Social Thought, Current Humanities, Current Social Science, Current Science,* and *Current Reference.* We have included books in more than one of those groupings as appropriate; for example, each Garland reference book is in *Current Reference* and another subject category.

Once the scholar moves to one of the topical collection pages, he sees the books arrayed by

primary subject category; pictures of the books' dust jackets accompany some of the titles. (Exhibit 3 has part of the *Current Social Science* page; http://www.columbia.edu/cu/libraries/digital/texts/social_sciences.html.) He has two options at this point: (1) clicking on one of those titles and going directly to the Table of Contents for that books or (2) doing a keyword search on that whole topical collection.

Besides these core locations, the online books on CWeb are typically linked to several pages where potential users might find them. Most of these are subject listings that collection bibliographers maintain, e.g., *Online Books* on the Social Work Library home page links to the *Current Social Science* page, or the Medieval Studies home page listing of Internet resources links to *The Chaucer Name Dictionary*.

A scholar wishing use one of the online collections repeatedly could bookmark the relevant subject matter page. He would then need only to select that bookmark from within his browser in order to reach that page.

The five Web reference books in the Online Books collection are also included in a separate set of pages maintained by the Reference Department. The scholar must traverse several levels before reaching any of the resources using this route. Finally, some of these resources are linked to Web pages created by various other Columbia groups.

Exhibit 2. Online Books Evaluation Project: Titles Included - Home Page

http://www.columbia.edu/dlc/olb/

Exhibit 3. Online Books Evaluation Project: Titles Included - Current Social Sciences

http://www.columbia.edu/cu/libraries/digital/texts/social_sciences.html

3.3.4 Publicity Campaign

Our publicity campaign for the online books collection has had several facets. The key component is a set of flyers, each focusing on one category of books. These flyers have major headlines followed by a listing of the online books available in that category, a brief explanation of the Online Books Evaluation Project, and then directions on how to reach and use the collection. These flyers have been sent to all the faculty members in each of the related departments and to graduate students whom we have identified as teaching in those departments. In some cases in which faculty members are using one of the titles in a course, we have provided copies of the flyer to each student. In some cases, we have gone to those classes to discuss the Project and how to use the books. We have also made presentations to faculty groups about the Project. More such presentations will be made in future semesters.

At this point, we are seeking a viable balance in our publicity. Over-promoting a collection that contains only a few books may create disgruntled potential users who are likely to be skeptical about the collection in the future. On the other hand, publicity is needed in order to create the awareness and sampling that are necessary precedents to regular use of online materials. Marketing research shows that publicity is most successful in cases in which a target group is generally seeking the product being offered. In our case that is scholars are likely to focus on publicity when they need to use one or more of the available books, e.g., Social Work students

who are using one of the titles in a course or undergraduate students who have been told to use *The OED* for an assignment.

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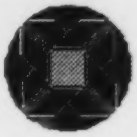

Conference Organized by The Andrew W. Mellon Foundation

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Session #4 Patterns of Usage

Online Books at Columbia: Measurement and Early Results on Use, Satisfaction, and Effect

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and

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4. USE OF ONLINE BOOKS

4.1 Methodology For Studying Use of And Reactions to Various Formats

We laid out the evaluation methodology for this Project in our *Analytical Principles and Design.* This methodology, formulated in the first year of the Project, remains the working plan.

4.1.1 Measurement Plans

Analytical Principles and Design sets forth our plans in this area as follows:

Success of online books is in large part measured by the rate of adoption by the scholarly community and the extent to which they appear to be replacing print books in use. Data on the use of online books and circulation of print books are also available which will allow us to draw certain conclusions on how the various formats are being used.

A related component of our plan is to study the socio-technical environment in which the Columbia community functions and adoption of other forms of electronic communication and scholarly research under the hypothesis that the more Columbia scholars are familiar and comfortable with computing and electronic resources the more likely they are to adopt online books. We summarize some of the early data on this socio-technical environment below. (Section 7 discusses this analysis further.)

4.1.2 Documentation Measures for Use of Online Books

Some of the key measures for documenting use of the online books are:

- The records of the Columbia computing system provide, for the most part, the use data for the online books. For books accessed via the World Wide Web, information on date, time and duration of session involving an online book, user's cohort, location of computer, number of requests and amount of the book requested, means of accessing the book, and networked printing activity will be available. These data will become available in summer 1997 with the full implementation of the authentication system and related databases.

- Circulation data for each print book in the regular collection provides information on number of times a book circulates, circulation by cohort, duration of circulation, number of holds and recalls. For most libraries, the data available for reserve books is the same as that for books in the regular collection as the CLIO circulation system is used for both.

- The records of the Columbia computing system provide, for the most part, the use data for the books accessed via CNet, Columbia's original, gopher-based Campus Wide Information System, including the number of sessions and hits, their date and time. These records do not include the duration of the session, the activity during the session, e.g., printing or saving, or anything about the user. Thus, all we can analyze are the patterns of use by time of day, day of week, and over time.

- Until March 15, 1997, for books accessed via CWeb, we knew the use immediately preceding the hit on the book, the day and time of the hit. For data collected through that point, our analysis is constrained to patterns of use by time of day, day of the week, and

over time. By manual examinations of server data, we counted how many hits a user made on our collection during one session and the nature of those hits.

- Since March 15, 1997, we are able to link user information to usage information and derive a series of analyses involving titles used, number of hits, number of books used, and the like by individual and to group those individuals by department, position, and age. These data do not yet include number of sessions of use, just the magnitude of overall use during the period. Session specific data will be available by fall 1997.

4.1.3 Documentation Measures for Reactions to Online Books

We are using a wide range of tools in trying to understand the factors that influence use of online books.

Table 1 summarizes our complex array of surveys and interviews.

Table 1. Types of Surveys

Population	Method	Contact	Rate	Remarks
Users of Online Books	Online instrument	Passive	Low	
Users of Online Books	Online post-use survey	Passive	Very Low	
Users of paper alternatives	Response slips in books	Passive	Unknown	Levels of use not known
Users of course materials in either form	Interviews distributed in class	Active	High	
Users and non-users	Library & Campus-Wide surveys	Active	Moderate	No full active survey of the campus has been done
Discipline-specific potential users	Surveys & Interviews	Active	High	Thus far only conducted before books were online

Note: Passive instruments are ones which the user must elect to encounter. Active instruments are distributed in some way, to the attention of the user. High response rates are in the range of 80-90 percent completion, with better than 60 percent usable.

4.2 Socio-Technical Environment

In our analytical construct, we posit that three sets of socio-technical environmental factors and their change over time will influence the adoption of online books by the Columbia community. These are external (U.S.), disciplinary, and Columbia-related factors. The first and the third of

these are discussed below.

4.2.1 External Socio-Technical Environment

In tracking the external socio-technical environment that might affect adoption of online books by members of the Columbia community, we look at three primary measures:

1. Attention to the Internet and related issues in the press, measured by *New York Times* articles;

2. Trends for prices and technical specifications for personal computers, measured both by looking at recommendations for minimum computer standards offered by various writers and at the offerings of Gateway 2000; and

3. Penetration of computers, modems, Internet access into American homes as reported by various market research companies.

Our findings to date are summarized below.

4.2.1.1 Media Coverage Of the Internet

We hypothesize that members of the Columbia community are more likely to feel that up-to-date personal computer systems and online resources are important to their lives and scholarly work the more the media that they see report on them. *The New York Times* is our media proxy in tracking the number of stories that community members might have seen involving online-related topics over the past three years.

Table 2. *New York Times* Stories Involving Information Services

Descriptor Term	1994	1995	1996	1994 - 1996	Pct Chg. '94-'95	Pct Chg. '95-'96
Internet	66	315	360	741	377%	14%
Online Information Services	0	161	140	301	NA	-13%
World Wide Web	0	112	106	218	NA	-5%
Information Superhighway	27	12	5	44	-56%	-58%
Electronic Publishing	30	29	24	83	-3%	-17%
Computer Networks	187	129	46	362	-31%	-64%

Source: *Periodical Abstracts*, using so=New York Times, de=Descriptor Term here, and period=Year given here.

Discussions of the *Internet* soared from 1994 to 1995 and then stayed at a relatively even level of about one story a day. *Online Information Services* and *World Wide Web* went from not even being descriptor terms in *Periodical Abstracts* for 1994 to coverage at about half the rate

of the Internet in general in the next two years. These terms seem to have supplanted *Computer Networks* which was a significant term in 1994.

4.2.1.2 Personal Computer Specifications & Pricing Trends

Since the development of personal computers we have seen a continual growth in the quality of the systems on offer and a flat or declining price for the systems recommended for household purchase. In 1997 for the first time, manufacturers have introduced systems priced at around $1,000 that will allow a household to access the Internet smoothly if not with the speed and monitor performance of a system costing twice that much. In June 1997, Gateway 2000 was offering a family-oriented system for $1,499 that was significantly more powerful in almost every parameter than a system priced at $1,999 in May 1996.

Appendix 3 tracks the minimum recommended specifications for home computers given by various writers from May 1994 to April 1997. Summarizing these data by looking at three major factors (CPU, RAM, and hard drive capacity)), we see dramatic increases over the past three years. In the earlier years, neither Pentium CPUs nor personal computer hard drives with capacity above 340 MB were even available.

Table 3. Minimum Recommended Specifications for Home Computers, May 1994 - April 1997

	May 1994 (for student)	April 1995	April 1996	April 1997
CPU	486	486DX2/66	75 Mhz Pentium	166 Mhz MMX Pentium
RAM	4 MB	8 MB	8 MB	16 MB
Hard Drive	100 MB	340 MB	1 GB	2 GB
Price Est.	$1,500	$1,800 - $2,000	$2,000	Not given in the source
Note: This is an extract from Appendix 3.				

As one might expect given Gateway 2000's leading position in the family personal computer market, its offerings track these recommendations by journalists. As Appendix 4 shows, the personal computer capability available for about $2,000 has escalated since late 1994, our first data point. All of these computers are equipped with CD-ROMs, sound systems, and modems. Summarizing that appendix, we find that a $1,500 computer today is over twice as large and twice as fast as a $2,100 computer thirty months ago.

Table 4. Characteristics of a $2,000 Computer, December 1994 - June 1997

	Dec. 1994	April 1995	May 1996	May 1997	June 1997
CPU	60 Mhz Pentium	60 Mhz Pentium	120 Mhz Pentium	200 Mhz MMX Pentium	166 Mhz Pentium
RAM	8 MB	8 MB	16 MB	16 MB	16 MB
Hard Drive	540 MB	540 MB	850 GB	1.6 GB	1.2 GB
Price (+ shipping)	$2,099	$2,099	$1,999	$2,064	$1,499
Note: This is an extract from Appendix 4.					

4.2.1.3 Household Computer Penetration & Internet Access

Many market research reports estimate the penetration of computers and modems into U.S. households, access to and use of the Internet, and the like over the past few years. Unfortunately, the findings vary considerably for single points in time (see Appendix 5). Data from one source, Find/SVP, are summarized here.

Find/SVP's Emerging Technologies Research Group issued the results of its latest survey in early May 1997. The telephone survey, conducted from February to April 1997, included 1,000 adult current Internet users and 1,000 adult non-users. Its Web site (http://www.etrg.findsvp.com/internet/) has a substantive summary of its results. The report also summarizes historical penetration data back to 1994 and makes projections through 2001 in a chart (at http://www.columbia.edu/cu/libraries/digital/texts/forecast/) that tracks PC Households, Modem Households, Internet Households, and Non-PC Internet Access Households (NetTV). According to that chart,

- PC households are increasing at a relatively moderate rate - from about 30 million in 1994 to about 37 million in 1997 projected to about 40 million in 1999 and 46 million in 2001. U.S. households number just under 100 million, so these values approximate the household penetration as well - moving from the low 30's to about 46 percent.

- Modem households started out in 1994 as about 40 percent of PC households, but the two values are converging over time to 75 - 80 percent modem penetration in 1997 and a projection of about 95 percent penetration in 1999 and thereafter. Virtually any new household computer purchased from 1997 on will be equipped with a modem.

- Elsewhere, Find/SVP projects a rapid reduction in the market share of modems of less than 28.8 kbps - from 66 percent at year end 1996 to 30 percent at year end 1997 to only 10 percent at year end 1998. They project that 56.6 kbps modems will have 10 percent market share at year end 1997 and 25 percent at year end 1998. These values reflect the sales of modems, not the stock of household computers, which will lag this changeover considerably. This suggests that scholars reliant on modems to access online resources are likely to have relatively slow connections for the next few years. On the other hand, modems are not costly, so if a scholar finds the online resources valuable, he may upgrade to a faster modem.

- Internet households are following a similar pattern of increasing penetration within the

universe of modem households. Find/SVP estimates U.S. Internet households as:

Table 5. U.S. Internet Households

Year	Millions of HH	Penetration of Modem HH
1994	3.1	25%
1995	6.2	
1996	14.7	
1997	21.9	75%
1998	28.0	
1999	33.0	87%
2000	36.5	
2001	40.0	93%

- While there are hardly any Non-PC Internet Access Households, i.e., those using NetTV-type systems, now, Find/SVP estimates that there will be about seven million in 1999 and 24 million in 2001.

- Based on telephone surveys, Find/SVP estimates that 8.4 million U.S. adults were current users of the Internet in 1995, 28.8 million in 1996, and 31.1 million in early 1997. They project that 36.3 million adults will be users by year end 1997. Find/SVP asserts that *55 million Americans are poised to become Internet users*. Scholars have a greater exposure to the potential of use of the Internet than do adults in general, so their rate of adoption is likely to be more rapid.

- While Find/SVP found general enthusiasm about the Internet and the Web - about half the current adult Web users use it daily, they also found that nine million Americans have tried the Internet but are not current users.

An early 1997 Baruch College-Harris Poll survey of 1,000 households found 21 percent of U.S. adults (40 million) using the Internet and/or the World Wide Web. This figure is half of all computer users and double the number using the Internet a year ago. An additional 12 percent of respondents use commercial online services.

4.2.2 Columbia Socio-Technical Environment

Columbia infrastructure, penetration of ready access to computing, and amount of time spent in online activities are among the Columbia socio-technical environmental factors that may affect adoption of online books.

4.2.2.1 Campus Infrastructure: February 1997

Columbia's campus infrastructure is similar to that of other universities in its components and in

its constant expansion to meet community demand for access to email and other Internet services. Currently, a 10BaseT fiber optic campus network connects 65 buildings and a T3 line connects the campus to the Internet. Over 9,000 ports are connected to the network and over 20,000 computers are registered to community members. All fifteen undergraduate residence halls are pre-wired; the residence hall network has over 4,500 ports. Our modem pool is constantly growing to serve demand; 298 modems with SLIP/PPP support now handle over 52,000 calls on a typical week. Email servers managed over 442,000 email messages in 1996. The campus has 366 public workstations, kiosks, and lab computers; all are connected to the network.

4.2.2.2 Community Perceptions of Access To Computing Resources

Is there a computer (in the library or elsewhere) attached to the campus network (directly or by modem) that you can use whenever you want? is one of two constant questions on our various questionnaires. The most recent response to that question to date came in the Libraries' onsite user survey in March 1997.

- Almost 81 percent of the 2,367 respondents to this question answered *Yes*. This response indicates that, whether they possessed their own computers or not, most community members perceived that they had adequate access to networked resources.

- Looking at the responses by cohorts using individual libraries, we find that the shares responding *Yes* varied from highs of 100 percent for 54 users of the Geoscience Library and 96 percent of 70 users of the Physics Library to lows of 59 percent for 312 users of the Business and Economics Library and 54 percent for 22 users of the Rare Books and Manuscripts Library.

- As the following table shows, there is a statistically significant range to the responses by Columbia status. The particularly small sample of faculty members makes this value suspect. These values vary insignificantly from the equivalent survey a year earlier when the faculty count was 63.

Table 6. March 1997 In-Library Survey: *Is there a computer (in the library or elsewhere) attached to the campus network (directly or by modem) that you can use whenever you want?*

Cohort	Sample Size	Responding *YES*
Faculty Member	44	86%
Doctoral Student	468	85%
Masters Student	611	67%
Undergraduate	1,065	87%

In Fall 1995, we cooperated with the Office of the Provost in conducting a campus computing survey. The initial means of distributing this survey was an "opinion festival" in the rotunda of the main administration building. This festival was billed primarily as a food tasting; it attracted many students and few faculty members. The computing survey garnered 414 student responses - 125 graduate students and 289 undergraduate students spread fairly well across the four

classes. To amplify the graduate student and faculty counts we did follow-up mailings - to a sample of 2,000 graduate students and all faculty members. Responses were modest in number and quite skewed by department, especially for the faculty survey, so these data are unlikely to be reliable.

The share of Columbia community members reporting ready access to a networked-linked computer (the same question asked in the onsite library survey) by cohort is as follows.

Table 7. Fall 1995 Campus Survey: *Is there a computer (in the library or elsewhere) attached to the campus network (directly or by modem) that you can use whenever you want?*

Cohort	Sample Size	Responding *YES*
Faculty Member	143	90%
Graduate Student	301	80%
Senior	88	65%
Junior	71	63%
Sophomore	76	63%
Freshman	54	78%

With such small sample sizes for the undergraduate cohorts, there is no significant relationship between the shares reporting such computer access and level of study.

About 72 percent of undergraduates, 80 percent of graduate students, and 85 percent of faculty members responded *Yes* to the question *Do you have your own computer in your residence?* in this survey. That these values are higher than those for the access question may reflect that some of the students do not have modems or network cards in their computers or do not use them. Questions asking for details about the power of these computers and the degree to which they have communications hardware were not answered fully.

4.2.2.3 Community Use of Online Resources

A related question that we ask on all of our questionnaires regards time spent on online activities. For the 1996 and 1997 onsite library surveys, this was phrased as *On average this semester, how many hours per week do you spend in online activities (Email, Listservs & Newsgroups, CLIO Plus, Text, Image or Numeric Data Sources, Other WWWeb Uses)?* The respondent was instructed to write a value in the blank provided.

The following table gives a grouping of the distribution of the total responses to this question in 1997 in column 2, of the responses by those who claimed easy access to computers with online access in column 3, and of the responses by those who said that they did not have such access in column 4.

Table 8. March 1997 In-Library Survey: Weekly Hours on Online Activities by Access to Computers Linked to Campus Network, Winter 1997

	Percent of Respondents In Group		
Hours/Week	All (N=2,493)	W/Easy Access (N=1,853)	W/O Easy Access (N=428)
0	2.9%	1.4%	5.6%
1-3	46.4%	45.2%	49.8%
4-6	23.0%	23.8%	21.7%
7-9	6.1%	6.1%	7.5%
10-12	11.7%	12.4%	9.3%
13-15	3.2%	3.8%	1.2%
16-18	0.4%	0.4%	0.2%
19-21	3.7%	4.0%	2.8%
22-28	0.6%	0.4%	1.2%
29-35	1.2%	1.6%	0.2%
More than 35	0.8%	0.9%	0.5%

Even those who answered *No* to the previous question, i.e., they do not feel that they can use a computer attached to the campus network whenever they want, report spending substantial time on online activities each week (column 4 data). The mean number of weekly hours in online activities reported by those who reported any such use was 5.8 hours, with the greatest amount reported 60 hours (8 respondents).

Another way to look at these data is to group the responses by Columbia status of the respondent. This is done below for the four major scholarly components of the community. The cohorts include only those individuals who provided status information. Time spent in online activities was quite consistent across cohorts within the Columbia community; differences among cohorts were not statistically significant.

Table 9.March 1997 In-Library Survey: Weekly Hours In Online Activities by Columbia Status, Winter 1997

	Percent of Respondents In Group			
Hours/Week	Undergraduate Students (N=1,107)	Masters Students (N=649)	Doctoral Students (N=477)	Faculty Members (N=45)
0	2.1%	2.5%	1.7%	6.7%
1-3	49.4%	44.8%	44.2%	33.3%
4-6	22.4%	23.6%	23.1%	26.7%
7-9	6.7%	6.2%	6.3%	0.0%
10-12	10.2%	12.9%	13.8%	17.8%
13-15	2.6%	3.4%	3.8%	8.9%
16-18	0.4%	0.5%	0.6%	0.0%
19-21	3.3%	3.9%	3.6%	4.4%
22-28	0.4%	1.1%	0.6%	0.0%
29-35	1.3%	0.9%	1.7%	1.7%
More than 35	1.3%	0.3%	0.6%	0.0%
Mean	5.7	5.9	6.3	6.5

Differences in reporting make comparison with the 1996 results difficult, but it appears that average weekly hours online increased modestly from winter 1996 to winter 1997.

4.3 Findings On Use Of Books In Online Collection

At this point we will report on (1) trends in use of the CNet and CWeb books; (2); user location and cohort as suggested by host computer address; (3) distribution of use by day of week and time of day; (4) patterns of hits per Web session involving online books for two weeks' use and for the overall use of three social work titles; and (5) use of the online books by individuals from March 15 to May 31, 1997. Summarized below are findings in these areas for the various groups of books.

4.3.1 Reference Books

4.3.1.1 Total Use Over Time

Three reference works have been available online long enough to have generated substantial usage data. These are *The Concise Columbia Electronic Encyclopedia, Columbia Granger's World of Poetry,* and *The Oxford English Dictionary.* The three Garland titles have been online only since the turn of the year or later, so our usage data are very short term for these titles. All three are accessible both through CNet and CWeb.

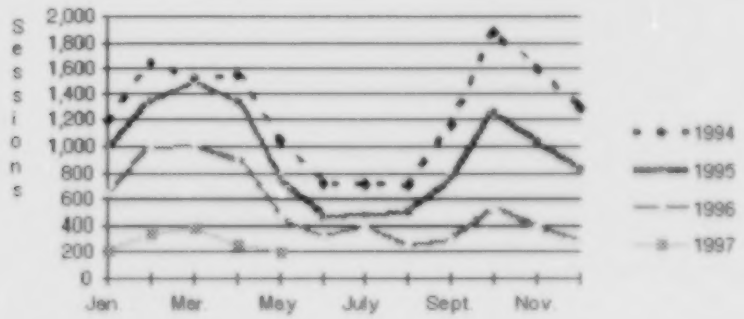
As of the time of this writing, CWeb usage data extended only through March 14, 1997 on a monthly basis. With the exception of *Columbia Granger's World of Poetry,* usage (number of hits and unique users) from March 15 to May 31, 1997 was reported as a single number. No

data are available for *Granger's* after March 14th. In the CWeb data reported below, the early March data is included with the newer data to give one value for the three month period of March to May.

4.3.1.1.1 Concise Columbia Electronic Encyclopedia

The *Concise Encyclopedia* remains on the older CWIS-gopher platform CNet. Usage declined 84 percent over the past three years, from 1,551 sessions in April 1994 to 250 sessions in April 1997. Usage has declined most in the current academic year; 7,861 sessions were registered from September 1995 to May 1996 and 2,941 sessions (63% fewer) from September 1996 to May 1997.

Graph 1. Concise Columbia Electronic Encyclopedia Sessions, 1994 - 1997: CNet



Potential reasons for this steep decline include:

- As community members have become more familiar with the Web, they may be searching it for answers that they might have sought in the *Concise Encyclopedia* when it was our only online encyclopedia.

- Columbia scholars should still be familiar with CNet and the library component, CLIO-Plus, since the library online catalog (CLIO) resides there, but the presence of periodical indexes and the like on the Web has shifted attention away from CLIO-Plus.

- Often encyclopedias on CD-ROM come bundled with new computers; many scholars may own or otherwise have access to these alternatives to the *CCEE*. Those who subscribe to America Online, Prodigy, or Compuserve can use the CCEE or similar resources on those online services.

- Columbia now provides CWeb access to the *Encyclopedia Britannica* (directly from the publisher's server); scholars may be using this instead of the *Concise Encyclopedia*. In December 1996, the Columbia community registered 15,436 hits on the *Encyclopedia Britannica*, up from 8,236 hits in September and 1,096 hits in July.

Columbia scholars seldom use the print copy of the *Concise Encyclopedia*, which resides behind the Reference desk. Its larger cousin, which is out in the public area, sees much greater use. We

plan to put that longer, one volume CUP encyclopedia online on CWeb this year. Its use patterns will be instructive.

4.3.1.1.2 Columbia Granger's World of Poetry*

Columbia Granger's World of Poetry is available on both CNet and CWeb. The CNet version is a lynx, non-graphical Web, formulation of the CWeb version. This resource, which became available to the community in online form in October 1994, locates a poem in an anthology by author, subject, title, first line, or keywords in its title or first line. In addition, it provides easy access to the 10,000 most often anthologized poems. As the following table shows, total usage declined from 1996 to 1997 - by 49 percent from the first quarter of 1996 to the first quarter of 1997. Even so, the 4,289 hits for 1996 is considerable.

Reference librarians report no more than a handful of uses of the print version of *Granger's* each year; it is kept behind the main reference desk and lacks the database of poems. The CD-ROM version, which is kept in the Electronic Texts Service, has the same functionality as the online version; it is used once or twice a month on average.

Table 10. Columbia Granger's World of Poetry: Number of Hits by Month

	CNet				CWeb			Total CNet & CWeb			% Change for Total		
	1994	1995	1996	1997	1995	1996	1997	1995	1996	1997	'94 to '95	'95 to '96	'96 to '97
Jan.	0	222	91	18	0	466	150	222	557	168		151%	-70%
Feb.	0	204	137	31	0	282	312	204	419	343		105%	-18%
Mar.	0	292	96	41	0	465	236	292	561	277		92%	-51%
April	0	199	73	34	0	278	NA	199	351	NA		76%	NA
May	0	134	35	17	682	199	NA	816	277	NA		-66%	NA
June	0	81	30		695	102	NA	776	239	NA		-69%	NA
July*	0	80	71		550	383		630	464			-26%	
Aug.	0	78	53		767	27		845	83			-90%	
Sept.	0	76	58		596	179		672	238			-65%	
Oct.	NA	162	84		863	262		1,025	348			-66%	
Nov.	311	114	50		800	413		914	465		194%	-49%	
Dec.	207	68	28		725	257		793	287		283%	-64%	
Total	**NA**	**1,710**	**806**		**5,678**	**3,483**		**6,758**	**4,289**		**NC**	**-37%**	

Note: * July 1995 CNet hits are estimated. CWeb data are available through March 15, 1997 only; this estimated value is twice the actual count.

4.3.1.1.3 The Oxford English Dictionary

BEST COPY AVAILABLE

At this time, *The Oxford English Dictionary* is the most heavily used reference work in our collection. As noted earlier, it is available on both CNet and CWeb, with the former format having greater functionality but being quite opaque. Users find the latter attractive and easy to use, but it only permits them to look up a definition or browse through the contents.

Usage of the CNet version dropped 59 percent from the fourth quarter of 1994 (2,856 hits) to the first quarter of 1997 (1,167 hits). The CWeb version attracted greater use than the CNet version from its first months. Total usage of the resource was greater with the two versions in place than with only CNet, by 55 percent in February 1997 versus February 1995.

Table 11. Oxford English Dictionary: Number of Hits by Month

	CNet				CWeb		Total CNet & CWeb		% Change		
	1994	1995	1996	1997	1996	1997	1996	1997	94 to '95	95 to '96	96 to '97
Jan.	0	643	497	259	0	385	497	644		-23%	30%
Feb.	0	939	1,065	434	0	1,022	1,065	1,456		13%	37%
Mar. *	0	847	683	474	0		683			-19%	
April	0	791	752	372	0	#919	752	2,065#		-5%	#12%
May	0	436	410	300	0		410			-6%	
June	0	336	310		0		310			-8%	
July *	0	300	328		0		328			9%	
Aug.	NA	299	282		8		282			-6%	
Sept.	NA	533	391		570		961			80%	
Oct.	1,238	1,017	783		647		1,430		-18%	41%	
Nov.	975	795	335		271		606		-18%	-24%	
Dec.	643	536	318		337		655		-17%	22%	
Total		**6,926**	**6,154**	**NA**	**NA**	**NA**	**8,069**	**NA**		**-11%**	

Note: * July 1995 CNet usage is estimated, as the true value was unavailable.

March - May 1997 hits; these data are somewhat under-counted as *The OED* was not included in the user-identified data set initially and as one form of bookmarked access was not included for the whole period. *The OED* became available on CNet in August 1994, but usage data are available back to October 1994 only.

Columbia College has a one semester Logic and Rhetoric course that is required of all its students (about 1,000 each year). Students in this course must complete an assignment involving the *OED* and are encouraged to use an online version. That assignment occurred in October 1996 and mid-February to early March 1997. In the period preceding mid-March 1997,

almost 42 percent of the hits (1,531) on the CWeb *OED* came from computers in dormitory rooms, suggesting that students are using this resource. This conclusion is confirmed by the analysis of the data by user in the period beginning in mid-March; see section 4.3.4.

Observation and reshelving activity show that scholars frequently use the print copy. However, statistics on use are unavailable as scholars have direct access to several sets in libraries around campus and have not been cooperative in recording use of volumes. In addition, scholars often owned their own copies of the compact edition of *The OED*. Finally, some serious scholars use the CD-ROM version in the Libraries' Electronic Text Service which allows refined searches with a search engine that is more attractive and user friendly than that in CNet.

4.3.1.1.4 Garland Reference Works

Garland's *Chaucer Name Dictionary* was added to the CWeb collection at the end of 1996. *Native American Women* was added in January 1997 and *African American Women* in February 1997. The first two were added to the CNet collection in February 1997 and the third in March 1997.

Table 12. Garland Reference Works: Number of Hits by Month, December 1, 1996 - May 31, 1997

	Chaucer Name Dictionary			***African American Women***			***Native American Women***		
	CWeb	**CNet**	**Total**	**CWeb**	**CNet**	**Total**	**CWeb**	**CNet**	**Total**
Dec. '96	28	NA	28	NA	NA	NC	NA	NA	NC
Jan. '97	62	NA	62	8	NA	8	60	NA	60
Feb.	107	15	122	26	NA	26	107	11	118
March	ND	8	NC		31			7	
April	#72	7	#90	#90	10	#139	#63	4	#77
May		3			8			3	
Total	269	33	302	124	49	173	230	25	255

Note: # March - May 1997 hits. NA - Resource was not available. ND: Data are not available.

NC - Not Calculable.

CWeb is a far more popular means of access to these resources than CNet. Although *Chaucer Name Dictionary* and *African American Women* were both available on CNet from February 3rd, their usage on CNet in February was only 10 to 15 percent of that on CWeb. The Libraries' print copies of these reference books are lightly used, so these hits signify substantial expansion of use of these books.

4.3.1.2 Host Computers for Reference Book Use

A user location analysis acts as a proxy for user cohort for the early use data. We have grouped host computers into the following ten categories.

cc - mainly computers in public labs

cul - computers in the libraries

cunix - in general on campus computers linked directly to a cunix server, also now the host computer for *Granger's*

cupress - computers at CUP

dialup - computers connected by dialup modem

english - computers in the English department

pols - computers in the Political Science department

rhno - computers on the residence hall network

sipa - computers at the School of International and Public Affairs

ssw - computers in offices and labs at the School of Social Work

other - computers at all other Columbia locations

The distribution of use of the five reference works supplied via CWeb across these categories is shown below. With the exception of the three Garland books, a very small share of the uses of these reference works occur on computers in the libraries; the Columbia community is taking advantage of the out-of-library access to these resources. As noted earlier, a large share of the use of *The OED* occurs from students' on campus residences (rhno host computers).

Table 13. Host Computers for Reference Book Use, May 1, 1996 - March 15, 1997 - Percent Distribution

Host Computer Type	*Granger's Poetry*	*OED*	*Garland Titles*
cc	1%	8%	2%
cul	1%	2%	40%
cunix*	64%	16%	**36%**
cupress	**	**	6%
dialup	6%	13%	0%
english	0%	0%	0%
pols	0%	0%	0%
rhno	9%	**42%**	4%
sipa	1%	1%	0%
ssw	7%	1%	3%
other	11%	16%	8%

Notes: * In the later part of this period, a Cunix server was given as the host computer for all uses of *Granger's*.

** Less than .5%

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Session #4 Patterns of Usage

Online Books at Columbia: Measurement and Early Results on Use, Satisfaction, and Effect

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. . . . . .

4.3.2 Monographic Books

4.3.2.1 Total Use Over Time

The Online Books Project includes three collections of monographic books for which we now have some use data. These are (1) *Past Masters*, classical texts in social thought; (2) *Columbia University Press Monographs*, mostly contemporary social work books; and (3) *Oxford University Press Monographs*, contemporary philosophy and literary criticism books. Most of these books came online during the 1996-97 academic year.

4.3.2.1.1 The Past Masters Collection

Until July 1996, ten *Past Masters* texts were available to the Columbia community online; since then, 54 texts have been available.

As Table 14a shows, from September 1996 to May 1997, the *Past Masters* texts registered about 2,460 hits from the scholarly community. Table 14b displays the number of hits on the eight most heavily used of these texts for the period from September 1996 to May 1997. This group of texts registered 1,692 hits from the Columbia community, or about 69 percent of the total usage for the *Past Masters* for this period. Thus, in a collection of texts that was not specifically selected to meet the specific needs of a set of users, we find that 15 percent of the texts accounted for 69 percent of the usage. The other 46 texts averaged about 17 hits each over this period, or about two hits per month.

Patterns of usage may be expected to change over time as various texts are used in courses or by researchers and as the Columbia community becomes more aware of the online books. It will be interesting to see how usage of the *Past Masters* evolves over the next academic year. The data to date remind us that to the extent that there are meaningful costs to creating online books (or journals) and to maintaining them as part of a library's collection, planners must select items for the online collection carefully. Of course, the decision rules for a consortial approach will be different from those for a group of non-cooperating individual libraries. We are attempting to delve into these cost issues and hope to have some findings by the end of 1997.

Table 14a. *Past Masters* On The Web, Total Monthly Hits: May 1995 - March 1997

Month	1995	1996	1997
January	NA	231	236
February	NA	298	334
March	NA	137	
April	NA	1,423	#205
May	0	144	
June	5	1,861	
July	0	513	
August	52	340	
September	0	330	
October	972	369	
November	619	604	
December	225	382	

Note: Early data include a substantial share of Project development hits as work was progressing on the texts. # March - May 1997 hits.

Table 14b. Key *Past Masters* Texts On The Web, Monthly Hits: August 1996 - May 1997

Author	Bacon	Bentham	Hamilton	Hobbes	Hume	Machiavel	Mill		
Title	*New Organon*	*Introduction Principles of Morals & Legislation*	*Federalist Papers*	*Leviathan*	*Enquiry - Principles of Morals*	*The Prince*	*On Liberty*	*US Constitution*	**TOTAL**
Sept. '96	45	1	23	21	5	61	1	35	192
Oct.	27	18	18	54	12	75	18	15	237
Nov.	321	4	1	**74**	2	**76**	5	16	499
Dec.	14	36	5	**99**	18	68	8	13	261
Jan. '97	63*	1	11*	9	60	30	2*	4	180
Feb.	34*	20	**13**	16	**39**	40*	**34**	16	212
March	*	0	*	1	12	*	*	5	18
April	#37*	0	#14*	0	0	#20*	#22*	0	#93
May	*	0	*	0	0	*	*	0	NC
Total	541	80	13	274	148	310	90	104	1,692

Note: Values that are in **bold** indicate that the text was in use in the Columbia College Contemporary Civilization class in that month. Other Past Masters texts used in that course (Locke's *Second Treatise on Civil Government*) did not make our heavy use list. * This text was on reserve for one or more courses during this semester. # March to May 1997 hits.

4.3.2.1.2 Columbia University Press Monographs

Cross title comparisons are difficult because books were made available to the community at different times - from September 1996 forward. Our design breaks these books into chapter files in most cases, so a hit gives a user access to a whole chapter if he gets beyond the Table of Contents file. As Table 15 shows, scholars are using these online books.

4.3.2.1.2.1 Social Work Books

In the period from May 1, 1996 to May 31, 1997, the social work books received a total of 1,948 hits, with a peak in October of 353 hits. The October peak reflects the use of the three books with the most hits in classes in the School of Social Work. **Bold** values on Table 15 indicate months in which we are aware that the book was being used in a class. If faculty members did not put the books on reserve in the library, we may not know that it was in use in a class. Also in many cases, although we know the book was used in a course, we do not know in which months. The secondary peak in February 1997 (278 hits on social work books) also reflects class use of the two titles with the greatest number of hits.

We informed the social work faculty of the availability of the online availability of these books in several ways over the months preceding their introduction. Furthermore, we requested permission of these instructors to conduct in-class surveys at the time they were discussing the

material from these books. These steps seem to have led the instructors to inform their students of the availability of these books online and to have caused some faculty and students to look at the online books. In the Spring 1997 term, we also provided handouts about the Social Work collection to several classes that were using books included in the collection.

Table 15. Scholarly Hits on Columbia University Press Books, May 1, 1996 - May 31, 1997

	1996								1997					1996-97
Title	**May**	**June**	**July**	**Aug.**	**Sept**	**Oct.**	**Nov.**	**Dec.**	**Jan.**	**Feb.**	**Mar.**	**Apr.**	**May**	**Total**
1. Handbook of Gerontological Services	0	0	0	4	15	**92**	18	12	13	21	#36			211
1. Philosophical Foundations...	9	3	0	7	15	19	5	11	14*	18*	*#25			126
1. Supervision In S.W.	16	11	1	3	23	**58**	47	13	31	**55**	***#42**			300
1. Task Strategies:	0	1	6	5	18	**150**	109	12	8	2	#288			599
1. Turning Promises ...	0	5	0	6	18	19	10	2	3	20	#32			115
3. Mutual Aid Groups. .	0	1	16	8	9	0	8	59	83	**151**	***#149**			335
5. Qualitative Research In S.W.	0	0	16	4	6	1	3	8	54*	11*	***#10**			113
Total Social Work	25	22	39	37	104	339	200	117	206	278	#356			1799
2. Seismosaurus	0	0	0	0	0	26	55	11	12	39	#10			153
5. Sedimentographica	0	0	0	0	0	0	0	0	29	4	#6			39
Total Earth Science	0	0	0	0	0	26	55	11	41	43	#16			192
3. Gender in Inter'l Relations	0	0	0	0	0	0	5	12	10	6	#22			55

Note: Numbers preceding titles indicate the month the book was made openly accessible to the community. 1=Sept. 1996 and on through the months. **Bold values** indicate months in which the book is known to have been used in a course; * indicates that the book was on reserve for one or more courses during the semester, but month(s) of use are not known. # March - May 1997 hits.

The following books had no hits by the end of May 1997: *Ozone Discourses, Jordan's Inter- Arab Relations, Hemmed In, Managing Indonesia.*

4.3.2.1.2.2 Other Works

The two earth and environmental science titles had 192 hits; the political science title received

55 hits. While these values do not seem large, they should be thought of in the context of the number of uses that a print copy would receive in a similar period if it were not on reserve for a course. If it is recalled almost at once, a book will circulate at most about six times during a semester. Books on loan are also unavailable for serendipitous use by scholars. For example, the two earth and environmental science titles had a total of only two circulations over the past three years.

As the following table shows, the paper copies of these books have experienced substantial circulation, some regular and some reserve, over the past three years. It does not seem that circulation of the print copy has declined with the introduction of the online versions. In fact, it is likely that online availability has created an expanded audience for at least some titles. Further analyses of the print circulation data will be conducted during summer 1997 to determine if additional expansion of use or new shifts in use can be discerned.

Table 16. Columbia Circulation of Columbia University Press Monographs: 1994 - 1996

	1/1994	2/1994	1/1995	2/1995	1/1996	21996	Total
Handbook Geront. Services	3	6	0	18	8	7	42
Mutuai Aid Groups...	0	19	17	16	7	9	68
Qualitative Research In Social Work	0	1	5	4	1	1	12
Supervision In Social Work	39	3	47	4	30	4	127
Task Strategies:	0	15	8	0	15	18	56
Philosophical Foundations of S. W.	0	3	2	1	1	1	8
Turning Promises Into Performance	3	3	7	3	6	1	23
*Sedimentographica**	0	0	0	0	0	1	1
Seismosaurus	0	1	0	0	0	0	1
Gender in Internatl Relations	3	8	13	2	7	5	38

Note: * Title acquired in 1995. Periods are half years: January - June and July-December.

4.3.2.1.3 Oxford University Press Monographs

The first Oxford monographs were introduced to the Columbia community in mid-Fall 1996. Six books of literary criticism and 12 of philosophy were online by June 1997; Tables 17a and 17b

detail the month of introduction and the usage for each. The literary criticism titles received 92 hits through May 31, 1997; the philosophy titles 626 hits.

None of these books was on reserve for a course Fall 1996 or Spring 1997. This is not surprising. Few monographs in the Libraries collection are on reserve for courses. Also, faculty members may take a while to become acquainted with newer monographs and to decide to include them in a course. Potentially, a great value of placing new monographs online will be in helping scholars to maintain current awareness in their fields of scholarship and teaching.

Table 17a. Scholarly Uses (Hits) Oxford University Press Monographs In Literary Criticism, May 1, 1996 - May 31, 1997

Author	*May*	*Lowrey*	*Moses*	*Morrison*	*Spiegel-man*	*Parkes*	
Title	*2. Children's Literature & Critical Theory*	*2. "Littery Man"*	*2. Novel & Globalization of Culture*	*2. Poetics of Fascism*	*4. Majestic Indolence*	*6. Modernism & Theater of Censorship*	*Total*
May '96	0	0	0	0	0	0	0
June	0	0	0	0	0	0	0
July	0	0	0	0	0	0	0
August	0	0	7	0	0	0	0
Sept.	0	0	0	0	0	0	0
Oct.	0	0	0	0	0	0	0
Nov.	0	3	0	2	0	0	5
Dec.	6	0	11	0	0	0	17
Jan. '97	5	7	4	6	12	0	34
Feb.	1	7	8	7	1	0	24
March			0	0		0	
April	#7	#3	0	0	#2	0	#12
May			0	0		0	
Total	19	20	23	15	15	0	92

Note: Numbers in column headings stand for the month the book entered the public online collection: 1. October 1996 2 November 1996 3. December 1996 4. January 1997 5. February 1997 6. June 1997.

Earlier uses are by individuals informed of the URLs. # Hits for March - May 1997.

Table 17b. Scholarly Uses (Hits) Oxford University Press Monographs In Philosophy, May 1, 1996 - May 31, 1997

	1996								1997					1996-97
Title	**May**	**June**	**July**	**Aug**	**Sept**	**Oct.**	**Nov.**	**Dec.**	**Jan.**	**Feb.**	**Mar**	**Apr.**	**May**	**Total**
Autonomous Agents	0	0	0	0	5	0	0	5	2	20	#3			35
Bangs, Crunches, Whispers & Shrieks	0	1	16	8	11	0	4	8	8	7	#26			89
Free Public Reason:	0	0	0	0	8	0	2	7	0	11	#32			60
Freedom & Moral Sentiment	0	0	0	0	5	0	0	2	2	1	0			10
Law & Truth:	0	0	0	0	0	0	9	0	7	5	#4			25
Morality, Normativity & Society	0	0	2	6	9	0	4	1	14	33	#1			70
Nietzsche's System	0	3	0	0	7	0	0	7	7	2	#9			35
Other Minds: Critical Essays	2	3	5	0	5	0	15	9	12	23	#39			113
Philosophy of Mathematics...	0	0	0	0	8	0	2	3	2	0	#6			21
Real Rights	0	0	3	0	8	0	0	0	5	3	#3			22
Self Expressions:	4	24	14	2	7	0	4	2	9	30	#21			117
The Logic Of Reliable Inquiry	0	3	0	0	6	1	2	4	3	1	#9			29
Total	6	34	40	16	79	1	42	48	71	136	#153			626

Note: Numbers preceding titles indicate the month a book was made openly accessible to the community. Earlier use is by individuals who knew the non-public addresses for the books. All of these books, with the exception of *Law & Truth*, became available to the community in October 1996. *Law & Truth* became available in November 1996. # Total hits March - May 1997.

Table 18. Columbia Circulation of Oxford University Press Monographs: 1995 - 1996

	1/1995	2/1995	1/1996	2/1996	Total
Children's Literature & Critical Theory					
*"Littery Man"**	0	0	0	1	1
Majestic Indolence	0	1	0	0	1
Novel & Globalization of Culture	0	1	3	0	4
Poetics of Fascism	0	0	3	0	3
Autonomous Agents	0	2	1	2	5
Bangs, Crunches, Whispers & Shrieks					
Free Public Reason:					
Freedom & Moral Sentiment	0	0	1	1	2
Law & Truth:					
Morality, Normativity & Society	0	1	0	2	3
*Nietzsche's System**	0	0	1	2	3
Other Minds: Critical Essays	0	1	0	0	1
Philosophy of Mathematics...					
Real Rights					
*Self Expressions: Mind, Morals &...**	0	0	0	3	3
The Logic Of Reliable Inquiry					

Note: * Title acquired in 1996. Data for the titles with blank cells were not collected in the report on circulation, either because they had not circulated through December 31, 1996 or because the Library Systems Office did not include this book in the report; they will be provided in the report in July 1997. A review of the online catalog shows that most of these books have circulated recently.

Although data on the Columbia circulation of the paper copies of these Oxford books are incomplete at this point, it is clear that these books have some interest for the Columbia community even though they are not on reserve for courses. They are circulating, while some other books sit on the shelf for years before someone checks them out.

One title that did not circulate greatly (*Other Minds*) was held by one scholar for 347 days from late 1995 through much of 1996, thus depriving other members of the community of the opportunity to encounter it, to determine whether it might be of value to their work, and to read it closely. As noted earlier, a key advantage of online books is their ready availability to the whole community at all times. The online version of *Other Minds* received 39 hits in 1996.

4.3.2.2 Host Computers for Monographic Book Use

The host computer categories used in analyzing the location of use of the various books were defined earlier. Looking at the Columbia University Press and Oxford University Press books as a whole, we find the distribution given below.

Table 19. Host Computers for Monographic Book Use, May 1, 1996 - May 31, 1997

Host Computer Type	Columbia University Press	Oxford University Press
cc	2%	5%
cul	19%	33%
cunix	11%	15%
cupress	12%	2%
dialup	11%	17%
english	0%	1%
pols	0%	0%
rhno	1%	3%
sipa	1%	*
ssw	41%	12%
other	5%	12%
Note: * Less than 0.5%.		

The detailed data on the host group for each book in the collection confirms what one would expect from these data -- host computer type is related to book type for the most part. However, once a group within the community becomes aware of the online books, they are likely to review other books in the collection (at least in this early stage when the collection is small). For example, half of the use of *Autonomous Agents: From Self Control to Autonomy* was from social work host computers. This is a title that might seem related to social work issues even though it is not one of the Columbia University Press social work books or part of the collection of the Social Work Library.

SSW was the host location for the following shares of the hits on the social work titles:

Handbook of Gerontological Services	53%
Mutual Aid Groups, Vulnerable Populations	76%
Philosophical Foundations of Social Work	39%
Qualitative Research in Social Work	69%
Supervision in Social Work	48%
Task Strategies: An Empirical Approach	68%

Closer analysis of the usage data finds substantial use from the computer lab in the Social Work School as well as from faculty computers. This suggests that many of these graduate students, most of whom do not live on or near campus, may not have Web access in their homes and, hence, at this point in time, are not equipped to take full advantage of the online books from home. Use of the online version enables them to use the books from the School, however, thus avoiding the walk of several blocks to the Social Work Library.

4.3.2.3 Use By Day And Time -- All Types of Books

Table 20 gives the breakdown of use of the online materials by day of the week for May 1, 1996 to March 15, 1997. Table 21 gives the breakdown by time of day for the same materials for the same period.

The patterns of use varied considerably among the families of online books. For example, 79 percent of the use of *The OED*, 80 percent of the use of the Oxford monographs, and 91 percent of the use of Columbia monographs occurred on weekdays. Friday alone accounted for 25 percent of the hits on Oxford monographs and 20 percent of the hits on Columbia monographs. This concentration of use is not surprising, as few classes meet on Friday at Columbia, making it a good day for both faculty and students to do research and class assignments. We will track future data to see if these patterns continue.

Table 20. Patterns of Use from Web Server: May 1, 1996 - March 15, 1997 Hits

	Granger's Poetry		Past Masters Texts		Oxford English Dictionary		Garland Books		OUP Monographs		CUP Monographs	
Day of Week	**Number**	**% of Total**	**Number**	**% of Total**	**Number**	**% of Total**	**Number**	**% of Total**	**Number**	**% of Total**	**Number**	**% of Total**
Monday	360	15%	1,338	26%	739	20%	137	26%	74	11%	247	12%
Tuesday	361	15%	1,090	21%	597	16%	144	27%	85	13%	439	20%
Wednesday	456	19%	741	14%	619	17%	93	18%	101	15%	416	19%
Thursday	273	11%	711	14%	447	12%	43	8%	101	15%	429	20%
Friday	486	20%	672	13%	484	13%	51	10%	166	25%	423	20%
Saturday	198	8%	224	4%	266	7%	6	1%	55	8%	99	5%
Sunday	268	11%	420	8%	520	14%	56	11%	74	11%	96	4%
Total	2,402	100%	5,196	100%	3,671	100%	530	100%	656	100%	2,149	100%
Weekdays:	1,936	81%	4,552	88%	2,887	79%	468	88%	527	80%	1,954	91%

Table 21. Hits by Time of Day: May 1, 1996 - March 15, 1997

	Granger's Poetry		Past Masters Texts		Oxford English Dictionary		Garland Books		OUP Monograph		CUP Monographs	
Time Period	Number	% of Total	Number	% of Total	Number	% of Total	Number	% of Total	Number	% of Total	Number	% of Total
Midnight - 6: AM	243	10%	375	7%	560	15%	65	12%	69	10%	46	2%
6: AM - Noon	365	15%	1,193	23%	405	11%	125	24%	96	15%	381	18%
Noon - 6: PM	1,275	53%	2,199	42%	1,288	35%	259	49%	386	59%	1,275	59%
6: PM - Midnight	519	22%	1,429	28%	1,419	39%	81	15%	105	16%	447	21%
9: PM - 9: AM	482	20%	1,202	23%	1,271	35%	122	23%	115	18%	148	7%
9: AM - 9: PM	1,920	80%	3,994	77%	2,401	65%	408	77%	541	82%	2,001	93%

The time of day analysis finds:

- The use of reference books occurred mostly in hours in which the libraries are typically open, i.e., between 9: AM and 9: PM, but a meaningful share - 20 percent (*Granger's)* to 35 percent (*OED)* - occurred from 9: PM to 9: AM.

- The use of online monographs occurred almost totally (93 percent for the Oxford monographs and 95 percent for the Columbia monographs) in hours in which the libraries are typically open, i.e., between 9: AM and 9: PM. Users of these books do not seem to have been taking advantage of the constant availability of online materials. This suggests that these books may have been receiving a large share of their use from computers in the libraries or elsewhere on campus, such as the computer lab in the School of Social Work, that are used predominately or exclusively during work hours. The distribution of use by host type is discussed in the preceding section.

The online versions of these books provide scholars with the flexibility of access to materials at times of the day and week when they cannot use them in the libraries, either because the libraries are not open or because the scholars are not able or willing to be in the library at that time. This flexibility is likely to enhance the scholar's efficiency and effectiveness, but use patterns do not yet indicate that it is being exploited.

4.3.3 Session Analysis for Use of CWeb Books

4.3.3.1 Two Weeks' Sessions - All Online Books

We extracted the Web session data for the online books for the weeks of October 26 and December 7, 1996, in order to learn about the number of sessions and the number of text hits

per session. The analysis involved looking for what seemed to be sequential hits from the same address, i.e., ones that were very close in time, and counting those as part of a session of using online books.

The number of sessions in the second week (212) was one-third greater than in the first week and the number of hits (611) was twice as great. The mean session included about two hits in the first week and three hits in the second. Several sessions seemed to involve systematic retrieval of many files.

One way to put this usage into perspective is to compare it to use of other library-related electronic services. In December 1996, bibliographic indexes on CLIO-Plus, the Libraries component of CNet, had a total of 16,740 hits (or about 4,000 per week). However, individual indexes sustained monthly usage ranging from 28 hits (AGELINE) to 2,743 hits (MEDLINE). In fact, only MEDLINE sustained an average number of hits per week that was greater than the number of hits to online books in the December 1996 sample week.

Table 22. Online Book Usage (Web): Hits Per Use Session

	Week of Oct. 26, 1996			Week of Dec. 7, 1996		
Hits Per Session	**# of Sessions**	**% of Sessions**	**# of Hits**	**# of Sessions**	**% of Sessions**	**# of Hits**
1	90	58%	90	102	48%	102
2	38	25%	76	56	26%	112
3	9	6%	27	17	8%	51
4	2	1%	8	9	4%	36
5	4	3%	20	4	2%	20
6	4	3%	24	4	2%	24
7	2	1%	14	3	1%	21
8	4	3%	32	6	3%	48
9	0	0%	0	2	1%	18
10-15	1	1%	11	3	0%	39
16-20	0	0%	0	2	1%	36
21-25	0	0%	0	0	0%	0
>25	0	0%	0	4	2%	104
TOTAL	**154**	**100%**	**302**	**212**	**100%**	**611**

4.3.3.2 Sessions for Social Work Books

As noted earlier, in Fall 1996, three social work books were most intensively used as they were assigned reading for courses. We analyzed the server statistics through the end of 1996 for these books in an effort to learn how deeply the books were used - to what extent use sessions included book chapters, the search engine, the pagination feature, and the like.

Looking at each of these three titles, we find:

- Relatively few sessions (7% - 24%) involved someone going to the Table of Contents/Title page for a book and stopping.

- Many sessions (28% - 59%) involved use of more than one chapter of the book; sessions averaged 1.4 to 3.5 hits on chapters, depending on the book used.

- Some users would seem to be repeat users who had bookmarked a chapter in the book or made a note of the URL as some sessions (9% - 17%) did not include a hit on the Table of Contents/Title page.

Summary data follow:

Table 23. Session Analysis for Social Work Books, Fall 1996

	Handbook of Gerontological Services		*Supervision in Social Work*		*Task Strategies*	
Number of Chapters/Essays in Book	10 chapters		10 chapters		11 chapters	
Sessions	41		46		58	
Hits	128		128		284	
Mean Hits/Session	3.1		2.8		4.9	
Sessions with Table of Contents Hit Only	4 (10%)		11 (24%)		4 (7%)	
Sessions with No Table of Contents Hits	7 (17%)		7 (15%)		5 (9%)	
Sessions with >1 Chapter Hits	15 (37%)		13 (28%)		34 (59%)	
TOTAL HITS ON:	**Number**	**Average/ Session**	**Number**	**Average/ Session**	**Number**	**Average/ Session**
Table of Contents	38	.9	47	1.0	60	1.0
Chapters	74	1.8	63	1.4	202	3.5
Page Locator	5	.1	3	.1	7	.1
Search	5	.1	10	.2	4	.1
Bibliographic Page	5	.1	4	.1	9	.2
Author Biography	1	*	1	*	2	*
Note: * Less than .05.						

4.3.4 Analysis of Unique Users Of Online Books

As of March 15, 1997, the online books system required users to sign in with email address and password, for all of our collection except *The OED* and *Granger's Index to Poetry*. This information can be combined with that obtained from the university's directory of its students and staff to obtain demographics on individuals who are using our books. Information on session behavior will be available late summer 1997. Summarized below are findings for the first period of 11 weeks, from March 15 - May 31, 1997, under the new system. Final exams for the Columbia spring semester ended on May 16th with graduation on May 21st. Thus, most of the period under analysis was a busy part of the academic year with only the last few days part of the early summer lull.

4.3.4.1 Use and Users

In this period, the collection (absent *The OED* initially) was used by 280 different persons making 1,439 hits, for an average of over five hits per user. One or more persons used 45 of the books in the collection. Looking at two data periods, we find use breaks down as follows:

Period	Hits	Mean Hits/Week	Unique Users	Mean Hits/User
March 15-April 14	591	138	107	5.5
April 15-May 31	848	126	173-280	3.0-4.9
March 15-May 31	1,439		280	5.1

Without a breakdown by individual, we cannot know the overlap between the 107 users in the first month (information obtained in an early analysis) and the 280 users over the whole period. We do know that the mean hits per user decreased from 5.5 in the first month to 5.1 for the whole period.

Comparing the number of hits on each book category for the two periods of data gathering, we find:

Table 24. Hits by Book Category, March 15 - May 31, 1997

	March 15 - April 14			April 15 - May 31		
Book Category	Hits	% of All Hits	Mean Hits/Wk	Hits	% of All Hits	Mean Hits/Wk
Garland	24	4%	5.6	83	10%	12.4
Granger's	NA	NA	NA	NA	NA	NA
OED*	70	12%	16.3	417	50%	62.1
Past Masters	94	16%	21.9	31	4%	4.6
Oxford Univ. Press	34	6%	7.9	76	9%	11.3
Columbia Univ. Press	369	62%	86.1	228	27%	34.0
TOTAL	591	100%	137.9	835	100%	124.4

* *The OED* was added late in the first period. One means of access for *The OED* is still not included.

As *The OED* came into the user-based analysis late, it had an artificially low number of hits and share of the total in the first period. As a result, the shares for the other book categories were inflated. In the second period, *The OED* has the prominence among the online books - a 50 percent share of hits - that the other server data have shown, even though one means of access is not included.

During the second period, use of the three Garland reference books doubled to an average of four hits per week per book and hits on the Oxford monographs increased 43 percent. Weekly

hits on the *Past Masters* decreased 79 percent and on the Columbia monographs 60 percent. Overall, average weekly hits were down ten percent.

4.3.4.2 Use Concentration

In this section we will analyze the data on the number of users, the amount of use per user, and the demographics of the user population for the various books. This analysis may shed light on the patterns of use and what factors favor use of online books.

4.3.4.2.1 Reference Books

The number of unique users, hits and mean hits per user for each of the reference titles for which data are available during this period was as the following table shows:

Table 25. Unique Users and Hits for Reference Books, March 15 - May 31, 1997

Title	Users	Hits	Mean Hits/User
The OED	173	487	2.8
Chaucer Name Dictionary	9	34	3.8
Native American Women	9	39	4.3
African American Women	6	33	5.5

These data show an inverse correlation between number of users and the mean number of hits per user.

4.3.4.2.2 Non-Reference Books

Half of the 82 online non-reference texts, including the *Past Masters*, were used during this 11 week period. The distribution of titles by number of users was as follows:

Table 26. Non-Reference Books by Number of Users, March 15 - May 31, 1997

Number of Users	Number of Titles	Share of Titles
30	1	1%
18	1	1%
8	2	2%
7	2	2%
6	3	4%
5	0	0%
4	4	5%
3	3	4%
2	10	12%
1	15	18%
0	41	50%

In declining order of number of users, the non-reference texts which had two or more unique users during this period, their number of users, number of hits, and mean hits per user were:

Table 27. Unique Users and Hits for Non-Reference Books, March 15 - May 31, 1997

Title	Users	Hits	Mean Hits/User
Task Strategies: An Empirical Approach to Clinical Social Work	30	288	9.6
Mutual Aid Groups, Vulnerable Populations and the Life Cycle	18	138	7.7
Philosophical Foundations of Social Work	8	21	2.6
Supervision in Social Work	8	33	4.1
Self Expressions: Mind, Morals and the Meaning of Life	7	21	3.0
Bangs, Crunches, Whimpers, & Shrieks	7	21	3.0
Handbook of Gerontological Services	6	31	5.2
Qualitative Research in Social Work	6	10	1.7
Turning Promises into Performance: The Management Challenge	6	31	5.2
Gender in International Relations	4	6	1.5
Other Minds	4	34	8.5
Seismosaurus	4	8	2.0
The Prince	4	12	3.0
Nietzshe's System	3	6	2.0
The Logic of Reliable Inquiry	3	7	2.3
The New Organon	3	24	8.0
Art of Rhetoric	2	8	4.0
An Essay toward a New Theory of Vision	2	2	1.0
Federalist Papers	2	9	4.5
Free Public Reason: Making It Up As We Go..	2	6	3.0
On the Principles of Political Economy...	2	6	3.0
Philosophy of Mathematics & Math. Practice in the 17th Century	2	3	1.5
Principles of the Most Ancient & Modern Philosophy	2	8	4.0
Real Rights	2	3	1.5
Reflections on the Revolution in France	2	5	2.5
Sedimentographica	2	6	3.0

Note: Titles in **bold** were on reserve for one or more courses in Spring 1997.

The two books with the most users, both social work texts, had the most hits and the first and fourth highest mean hits per user. They accounted for 426 (51%) of the 832 hits on non-reference texts during this period. The top four texts (five percent of the non-reference collection), all social work books, accounted for almost 58 percent of the non-reference hits. The mean hits per user are highly variable. Only six texts averaged more than five hits per user.

4.3.4.3 User Cohorts

4.3.4.3.1 Reference Books

The top user departments and Columbia statuses for the reference books are as follows:

4.3.4.3.1.1 The OED

The seven departments that were the source of four percent or more of the users were:

Department	User Share	Hits Share
Columbia College	21%	18%
Unidentified User (Barnard, Teachers College)	15%	16%
English	9%	13%
Engineering	8%	8%
Computer Science	6%	9%
General Studies	4%	4%
History	4%	2%
Total	67.00%	70.00%

Primary Columbia statuses that were the source of four percent or more of the users were:

Columbia Status	User Share	Hits Share
Undergraduate Student	58%	55%
Unidentified User	15%	16%
Graduate Student	6%	11%
Professional Student	4%	4%
Total	83%	86%

Faculty were responsible for a total of less than three percent of the hits on *The OED*.

4.3.4.3.1.2 Grangers Reference Works:

4.3.4.3.1.2.1 Chaucer Name Dictionary

The distribution of the nine unique users by department is:

Department	Number of Users	Share of Users
Unidentified User	2	22%
Engineering	2	22%
Columbia College	1	11%
English	1	11%
History	1	11%
Music	1	11%
General Studies	1	11%

The distribution of the nine unique users by primary Columbia status is:

Undergraduate Student	67%
Unidentified User	22%
Associate Professor	11%

4.3.4.3.1.2.2 Native American Women

The distribution of the nine unique users by department is:

Department	Number of Users	Share of Users
Unidentified User	4	44%
Columbia College	1	11%
Genetics	1	11%
Library Systems	1	11%
Social Work	1	11%
"0" *	1	11%

* To be identified

The distribution of the nine unique users by primary Columbia status is:

Unidentified User	44%
Undergraduate Student	22%
Graduate Student	22%
Catchall Other	11%

4.3.4.3.1.2.3 African American Women

The distribution of the six unique users by department is:

Department	Number of Users	Share of Users
Unidentified User	3	50%
Electrical Engineering	1	17%
Genetics	1	17%
English	1	17%

The distribution of the six unique users by primary Columbia status is:

Graduate Student	33%
Undergraduate Student	17%
Unidentified User	50%

4.3.4.3.2 Non-Reference Books

Almost 91 percent of the users of the top four books, all social work titles, were from the School of Social Work; they accounted for 98 percent of the hits on those books. The vast majority of these users (56 of 64) were graduate students. With the exception of the most used one, *Task Strategies*, these books were on reserve for social work courses during the spring 1997 semester.

- Three sections, with a total of about 70 students, used *Supervision in Social Work* as a key text. Thus, potentially, if all seven graduate student users were members of these course sections, about 10 percent of the students used this book online during this half semester.

- A different three sections, again with about 70 students in total, used *Mutual Aid Groups*. This book was a major reading in the course; in fact, one of its authors taught two of the sections of the course in which it was used. Sixteen graduate students used this title for a potential penetration of about 23 percent.

- *Philosophical Foundations...* (as well as *Qualitative Research in Social Work*) was on reserve for a doctoral seminar which had an enrollment of 11 students. The instructor reported that this book was a major text in the course that students would have bought

traditionally. She did not know how many of her students used the online version. If all eight graduate student (7) and professional student (1) users were class members, that suggests a substantial penetration for that small class. However, it is likely that some of these users were not enrolled in that course.

- We have no explanation for the heavy use of *Task Strategies* (by 26 graduate students). The instructor for the course in which the book had been assigned the previous semester reported that she had not recommended it to her students.

The fifth and sixth most used titles - *Self Expressions: Mind, Morals and the Meaning of Life* and *Bangs, Crunches, Whimpers, & Shrieks* - are both Oxford University Press philosophy titles.

- *Self Expressions* is listed in the Current Social Science Web page along with the social work titles. Five of its seven users were from the School of Social Work, one from the Center for Neurobiology and Behavior, and one from Electrical Engineering. Five of the users were graduate students, one an undergraduate student, and one a post doctoral research fellow.

- *Bangs, Crunches, Whimpers, & Shrieks* is listed under *Physics* in the Current Science Web page. Two of its seven users were from the Physics department, another two from unidentified departments, and one each from Electrical Engineering, Engineering and General Studies. Five of the users were undergraduate students and two unidentified status.

Looking at the various non-reference collections overall, we find the following cohort dominance patterns:

4.3.4.3.2.1 Past Masters

The departments with four percent or more of the 125 hits on *Past Masters* were:

Department	Hits	Share of Hits
Economics	29	23%
Anthropology	16	13%
Political Science	16	13%
Visual Arts	13	10%
Unidentified	10	8%
History	8	6%
Columbia College	7	6%
English & Comparative Literature	7	6%
Physics	5	4%
Total	111	89%
Note: Detail may not sum to total due to rounding.		

The Columbia statuses with four percent or more of the hits on *Past Masters* were:

Columbia Status	Hits	Share of Hits
Undergraduate Student	86	69%
Graduate Student	11	9%
Unidentified	10	8%
Total	107	86%
Note: Detail may not sum to total due to rounding.		

4.3.4.3.2.2 Columbia University Press

The departments with four percent or more of the 597 hits on the Columbia University Press texts were:

Department	Hits	Share of Hits
Social Work	547	92%
Unidentified	28	5%
Total	575	96%
Note: Detail may not sum to total due to rounding.		

The Columbia statuses with four percent or more of the hits on these texts were:

Columbia Status	Hits	Share of Hits
Graduate Student	525	88%
Unidentified	28	5%
Faculty (Professor-Lecturer)	23	4%
Total	576	96%
Note: Detail may not sum to total due to rounding.		

4.3.4.3.2.3 Oxford University Press

The departments with four percent or more of the 110 hits on the Oxford University Press texts were:

Department	Hits	Share of Hits
International & Public Affairs	26	24%
Social Work	21	19%
Engineering	10	9%
Political Science	8	7%
Unidentified	8	7%
Physics	5	4%
Lamont-Doherty Observatory	5	4%
Total	83	75%
Note: Detail may not sum to total due to rounding.		

The Columbia statuses with four percent or more of the hits on these texts were:

Columbia Status	Hits	Share of Hits
Undergraduate Student	35	32%
Graduate Student	30	27%
Professional Student	26	24%
Unidentified	8	7%
GRA	5	4%
Total	104	95%
Note: Detail may not sum to total due to rounding.		

4.3.4.4 Online Book Use Per User

The distribution of number of hits on the online books collection per user over this period indicates that while many users are making quite cursory use of the online books, more are looking at more than one file (e.g., reference entry, chapter) in the collection.

Table 28. Distribution of Hits Per Unique User, March 15 - May 31, 1997

No. Of Hits Per User	% of Total Users
1	34%
2	16%
3	8%
4	8%
5	4%
6 - 10	16%
11 - 15	5%
16 - 20	5%
21 - 25	2%
>25	2%
Detail may not sum to 100% due to rounding.	

The distribution of number of unique titles viewed by these users over this period indicates that most users come to the collection to look at a single book. The greatest number of books used by a single person was seven (by two persons).

Table 29. Distribution of Unique Titles Viewed Per User, March 15 - May 31, 1997

No. Of Titles Viewed Per User	Number of Users	% of Total Users
1	225	80%
2	32	11%
3	11	4%
4	8	3%
5	1	*%
6	1	*%
7	2	1%
Total	280	100%
Note: Detail may not sum to total due to rounding. * Less than 0.5%		

Not surprisingly, there is a certain correlation between number of hits and number of titles used. Those with only one hit could only have looked at one title (42 percent of those using one book). The range of hits among those who used only one book is wide - 20 (9 percent) had more than ten hits. Six users had more than 25 hits; two of them looked at only one book, one each at two and three books, and two at seven books. These statistics indicate some significant use of the collection as measured by average number of hits per title used.

However, hits on several titles need not indicate heavy use of the online books collection. The individual who looked at five books had a total of only six to ten hits as did four of the seven people who looked at four books (one to two hits each). The person who looked at six books had 11 to 15 hits in total (an average of about two hits per book).

As the following table shows, graduate students tended to have more hits, undergraduates and faculty fewer hits.

Table 30. Hits Per Unique User by Academic Cohort, March 15 - May 31, 1997

Academic Cohort	N=	1 Hit	2-3 Hits	4-5 Hits	6-10 Hits	11-20 Hits	>20 Hits
Undergraduate	114	40%	28%	13%	14%	4%	1%
Grad. Student	66	18%	14%	9%	20%	27%	12%
Prof'l Student	9	33%	22%	22%	11%	0%	11%
Faculty	12	42%	25%	17%	8%	8%	0%

These are highlights of the recent data on usage by individuals. Once we have the information on sessions, we will be able to derive valuable information on user behavior - not only number of books used and hits on those books but parts of the book used and repeat usership. We will begin to be able to see revealed preference in user behavior and will be less reliant on responses to questionnaires.

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Scholarly Communication and Technology

Conference Organized by The Andrew W. Mellon Foundation

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Session #4 Patterns of Usage

Online Books at Columbia: Measurement and Early Results on Use, Satisfaction, and Effect

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5. UNDERSTANDING FACTORS INFLUENCING USE

One of our principal goals is to understand what distinguishes users from non-users, early adopters from late adopters, and so on. We have tentatively identified several kinds of variables that might influence users with regard to adoption of electronic books. We can broadly divide these into: resource factors (discussed here), attitude factors (discussed in section 6), and behavior factors (discussed in section 7).

5.1 Resource Factors

We believe the key resource factor to be possession of, or easy access to, adequate computer equipment and connections, so that online books are a reasonable alternative to paper versions. As noted earlier in a discussion of early research results, we have two primary methods of studying this factor:

1. Asking the question about access to computers with network connections that was discussed earlier; and

2. Developing a detailed profile of the computer resources available to representative samples of members of the Columbia community. As described earlier, we used the campus computing survey instrument in three sweeps through the community, in what we regard as pilot implementations in Fall 1995 and Winter 1996. The questionnaire asked respondents for detailed information about their computers. However, many respondents did not supply the requested data on computer power, size of hard drive, modem speed, and the like. Furthermore, observation of developments in the personal computer marketplace makes it clear that changes in personal computers will make the top of the original scales on these questionnaires the bottom of the scales in as little as two years.

Section 7 contains further analyses of the first of these factors.

5.2 Attitude Factors - In-Class Survey

We cannot probe attitude factors easily in a simple survey, whether in paper or online. We have designed some questions aimed at assessing whether the respondent thinks that members of his peer group use and/or prefer electronic access to books and other resources. On the one hand, this perception of others' preferences might precede and shape a user's own preferences and behavior. Alternatively, if use of computer modalities is, as some psychological research suggests, a very private activity, awareness of the behavior of others may, in fact, lag the move to using online books.

5.2.1 The In-Class Survey

Examples of such results include the data from Fall 1996 and Spring 1997 in-class surveys of students who were assigned a reading that was available online for the session during which the survey was administered. Students who had done the reading were asked to answer questions about what forms of the book they used, how long they used that form, where they did that studying, format preference, reasons for it and impacts, expectations for format most used by classmates, and the two benchmark questions about computer access and time online. (See Exhibit 4.) Those who had not done the assignment were asked to respond only to the last three

questions.

Exhibit 4. Survey Of Book Use For Course Readings

As part of its effort to serve you better, the Libraries would like to know what methods you used in reading an assignment for this class session. All responses will be kept confidential.

A. Did you read the assignment in Kadushin's **SUPERVISION IN SOCIAL WORK** for this class session?

1. YES ***(If so, please answer all the questions.)*** 2. NO ***(If not, please skip down and answer Questions F-I* only.)**

B. Following is a list of methods that you might have used in doing this reading. Please tell us about your use of each for this assignment. If you used a method, please tell us for about how long you used it and where you did this reading.

Methods of Reading This Assignment	**Did you use it? (Please circle)**	**For about how long? # Hours & # Minutes**		**Where (e.g., library, dorm room, lounge, classroom)?**
1. Your own copy of the book	1.YES 2.NO			
2. A friend's copy of the book	1.YES 2.NO			
3. A library copy of the book	1.YES 2.NO			
4. Photocopy from paper copy	1.YES 2.NO			
Using CWeb Online Text:				
5. Reading it directly from CWeb	1.YES 2.NO			
6. JAKE printout of text	1.YES 2.NO			
7. Printout using non-JAKE printer	1.YES 2.NO			
8. Download of online text to disk & reading away from CWeb	1.YES 2.NO			

C. If you used more than one method, which one did you like best? (Please circle the number of the preferred method from the above table.) **1 2 3 4 5 6 7 8**

D. Why did you like that method best? (Please circle the numbers of all the reasons that apply.)
1. Less costly 2. Easy to get to 3. Easy to read 4. Always available 5. Easy to copy 6. Easy to search for words or concepts 7. Easy to annotate/take notes 8. Other reasons:

E. What were the impacts on your work of using the method you liked best? (Please circle the numbers of all that apply.) 1. I learned better. 2. I learned faster. 3. Learning was more fun. 4. I was more likely to do the assignment. 5. Reading the assignment was more difficult. 6. Doing the assignment was faster. 7. Doing the assignment was slower. 8. Other impacts:

F. Which of these methods of reading this assignment do you think was most used by your classmates? (Please circle the number of the method from the above table.) **1 2 3 4 5 6 7 8**

G. Is there a computer connected to the campus network (by modem or direct link) that you can use whenever you want? (Please circle.) 1. YES 2. NO

H. About how many ***hours per week*** do you spend in each of the following online activities?

_____ Email _____ Listservs and Newsgroups _____ CLIO Plus

_____ Scholarly Text, Image or Numeric Data Sources _____ Other WWWeb

I. Your insights into your experience and preferences in using various book formats are valuable:

Thank you for your assistance with this study.

Form 8, 9/96: Distribution Date: 4/29/97 Course: SOCW T7134

In Fall 1996, most of this surveying (67 percent of a total of 439 responses) was done in sections of Columbia College's Contemporary Civilization course for which some of the readings are available in the *Past Masters* set of humanities texts. However, those students are expected to use the assigned editions of the readings and to bring a copy to class for use during the discussion. This may well have biased students' choices in methods of reading the assignments. About 16 percent of the cases in the sample came from graduate Social Work classes and 17 percent from a large upper level undergraduate political theory class.

In Spring 1997, the Contemporary Civilization course was the source of 106 (44 percent) of the 239 respondents. Two political science courses, one undergraduate and one graduate level, were the source of another 17 respondents (7 percent). Four graduate Social Work courses were the source of the remaining 116 respondents (49 percent).

5.2.2 Methods of Studying A Class Reading

Some students had not done the reading for the course session in which the surveying was done. Some others reported using more than one method.

Table 31. Methods of Reading This Assignment: Whole Sample Fall 1996 And Spring 1997

	Fall 1996		Spring 1997	
Methods of Reading This Assignment	**Count**	**% of Responses**	**Count**	**% of Responses**
Used Own Copy	269	70%	141	73%
Used Friend's Copy	54	14%	20	10%
Used Library Copy	33	8%	17	9%
Used Photocopy	11	3%	17	9%
Reading it directly from CWeb	0	0%	0	0%
JAKE printout of text	10	3%	16	8%
Printout using non-JAKE printer	4	1%	4	2%
Download of online text to disk & reading away from CWeb	5	1%	1	*%
Total	**386**	**100%**	216	**100%**

This table shows that, in Fall 1996, 70 percent of the responses reported using one's own copy of the text. The next most common method was to use a friend's copy (14%). The shares for those two modes are insignificantly different in Spring 1997.

The questionnaire gives four alternative means of *Using CWeb Online Text:*

Reading it directly from CWeb

JAKE printout of text

Printout using non-JAKE printer

Download of online text to disk & reading away from CWeb

In Fall 1996, there were 19 reports (5 percent) of printing out or downloading from the CWeb books, but none of reading directly from CWeb. In 89 percent of those cases, the respondent was not in a Contemporary Civilization class. In Spring 1997, about 11 percent of responses reported using some form of the online text, but again none reported reading on screen.

5.2.3 Preferences for Studying Class Reading

There were far fewer responses (119 in Fall 1996 and 88 in Spring 1997) as to the preferred mode of studying. In both semesters about two thirds of respondents reported that reading their own copy was preferred.

Table 32. Preferred Method Reading This Assignment: Whole Sample Fall 1996 and Spring 1997

	Fall 1996		Spring 1997	
Preferred Method of Reading Assignment	**Count**	**% of Cases**	**Count**	**% of Cases**
Own Copy	83	67%	56	64%
Friend's Copy	9	8%	6	7%
Library Copy	10	8%	6	7%
Photocopy	7	6%	8	9%
Reading it directly from CWeb	2	2%	7	8%
JAKE printout of text	7	6%	6	7%
Printout using non-JAKE printer	3	2%	5	6%
Download of online text to disk & reading away from CWeb	3	2%	1	1%
Total Responses	124	101%	95	109%
Total Cases Responding	**119**		**88**	
Note: Detail may not sum to 100% due to rounding.				

5.2.4 Reasons for Preference

As the following table shows, in both semesters, the three strongest reasons for preference were *always available*, *easy to annotate*, and *easy to read*, with the last two reasons switching position between the semesters.

Table 33. Reason for Preferred Method: Whole Sample Fall 1996 and Spring 1997

BEST COPY AVAILABLE

	Fall 1996		Spring 1997	
Reasons for Preference	**Count**	**% of Cases**	**Count**	**% of Cases**
Less Costly	60	22%	33	23%
Easy to get to	0	0%	0	0%
Easy to Read	104	38%	70	48%
Always Available	199	72%	108	74%
Easy to Copy	21	8%	20	14%
Easy to Search for Words	30	11%	15	10%
Easy to Annotate	135	49%	57	39%
Other Reasons	25	9%	16	11%
Total Responses	574	209%	319	219%
Total Cases Responding	**276**		**146**	
Note: Respondents could give more than one reason for their preference.				

At present, these attributes are possessed only by a personal copy or photocopies from print copies or printouts from electronic copies. (Online books are *always available*, but one assumes that ready physical access to a computer does not meet the criterion *always* as students interpreted it here.)

The cross-tabulation of preferred method of use and reasons for that preference produces logically consistent results. For example, all of the respondents who gave *Printout using non-JAKE printer* or *Download of online text to disk and reading away from CWeb* as their preferred method gave *less costly* as one of their reasons while few of the those preferring their own copy gave that reason.

Table 34. Preferred Method & Reason for Preferred Method: Whole Sample Spring 1997 - Row Percentages

	Reason for Preference						
Preferred Method	**Less Costly**	**Easy to Read**	**Always Available**	**Easy to Copy**	**Easy to Search**	**Easy to Annotate**	**Other**
Own Copy	8%	47%	83%	7%	9%	41%	11%
Friend's Copy	75%	25%	75%	0%	0%	25%	0%
Library Copy	25%	25%	50%	25%	25%	0%	25%
Photocopy	50%	50%	33%	33%	0%	17%	0%
On CWeb	60%	20%	80%	20%	40%	0%	0%
JAKE Printout	50%	67%	83%	83%	0%	17%	0%
Other Printout	100%	20%	60%	60%	20%	20%	0%
Download to Disk	100%	0%	100%	100%	0%	0%	0%
Total	24%	44%	75%	16%	12%	33%	9%
Note: *Easy to Get To* was another reason offered but no one chose it in either semester.							

So we have a consistent picture of what makes a mode good, preferred, and used. In other words, our student respondents are behaving rationally.

5.2.5 Impact of Preferred Method

As the following table shows, when asked what the impact of the various possible modes was, a majority of the students selected *more likely to do the assignment*. *Learned better* and *doing assignment faster* ranked second and third, being cited by about one third of the students.

Table 35. Nature of Impact of Preferred Method: Whole Sample Fall 1996 and Spring 1997

	Fall 1996		Spring 1997	
Impact of Preferred Method	**Count**	**% of Cases**	**Count**	**% of Cases**
Learned Better	92	34%	51	34%
Learned Faster	51	19%	27	18%
Learning More Fun	16	6%	13	9%
More Likely To Do Assignment	154	57%	82	54%
Reading More Difficult	8	3%	1	1%
Doing Assignment Faster	85	31%	56	37%
Doing Assignment Slower	12	4%	2	1%
Other Impacts	29	11%	21	14%
Total Responses	**447**	**165%**	253	168%
Total Cases Responding	**271**		**152**	
Note: Detail may not sum to 100% due to rounding.				

These are again entirely rational bases for preferring some particular mode, when we note that a student's role is to get assignments done and to learn.

5.2.6 Comparison of Personal Behavior and Perception of Others' Behavior

Students were asked what method they thought most of their classmates used in order to learn whether they perceived a shift to using the online materials. In Fall 1996, 81 percent of respondents chose *own copy*, and 14 percent chose *library copy*. In Spring 1997, these values were 80 percent and eight percent, respectively. This contrasts with the reality that 70 percent (73 percent in Spring 1997) used their own copies, 14 percent (ten percent) used a friend's copy and eight percent (nine percent) used a library copy.

Interestingly, while none of the respondents had used the CWeb book directly to do this assignment, in both survey periods almost two percent (five or six students) gave that response to this question. In the fall, another nine students (two percent) and, in the spring, another 13 students (six percent) thought that their classmates had used some form of print copy or downloaded file from CWeb. Thus, students are over-estimating their colleagues' propensity to read directly from CWeb and under-estimating their propensity to read printed copy and downloaded files from CWeb.

Table 36. In-Class Surveys: Personal Behavior and Perception of Methods Used by Classmates to Read This Assignment: Whole Sample Fall 1996 and Spring 1997

	Fall 1996		Spring 1997	
Methods of Reading This Assignment	***Own Behavior***	***Perception of Others' Behavior***	***Own Behavior***	***Perception of Others' Behavior***
Used Own Copy	74%	81%	73%	80%
Used Friend's Copy	15%	7%	10%	4%
Used Library Copy	9%	14%	9%	8%
Used Photocopy	3%	4%	9%	7%
CWeb Directly	0%	2%	0%	2%
Used JAKE Print Copy	3%	1%	8%	5%
Used Other Print Copy	1%	*%	2%	1%
Used Download Copy	1%	1%	*%	*%
Note: * Less than .5%.				

At the present time, there is not sufficient penetration of the market by the online modes for us to draw any meaningful conclusions about leading and lagging impacts. Results of this survey in Fall 1997, particularly in Social Work classes, should give some indication of trends as students will have had more time in which to gain awareness of the availability and attributes of the online format.

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Session #4 Patterns of Usage

Online Books at Columbia: Measurement and Early Results on Use, Satisfaction, and Effect

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6. THE ONLINE SURVEY

6.1 The Online Interview Instrument

The online instrument is mounted as an HTML form. The key questions are presented here along with an example of the pull down list that accompanies one of the questions.Exhibit 5. Online Survey Instrument: Non-Reference Books

A. What is the title of the book you just used?

B. Please select the best description of that work or project for which you are using this book. If "Other", please specify:

1='Research project, e.g., paper, book'

2='Class preparation'

3='Current awareness in field'

4='Other University activity'

5='Other:

C. How long ago did you recognize the need to consult this book for this use?

__ [weeks__]

D. How soon do you expect to make use of what you get from this book?

__ [weeks__]

E. What did you do with this book on this occasion? (Select all applicable uses.):

__ Looked up something etc.

F. Which forms of this book have you ever used? (Select all that apply by checking the check boxes in the left column [Used] below.) If you have used this book in more than one way, which one do you prefer overall? (Select one of the 'radio' buttons in the right column [Prefer] below.)....

G. Referring to the way of using this book that you prefer, why do you like it best? (Select all that apply.)....

H. On how many occasions (including this one) have you used this book in any format during the last 3 months?

I. For approximately how many minutes in total have you used this book during the last 3 months?

J. About how many times in the past 12 months have you used an online book, i.e., a monograph or reference book available on CNet or another computer network? __ times.

K. In the type of work you are doing now, do you find that paper books or online books help you to be more productive?

L. Do you find that you are able to produce results of higher quality when you use paper books or online books?

M. Is there a computer attached to the campus network (by modem or direct link) that you can use whenever you want? Yes / No (*)

N. About how many hours per week do you spend in each of the following online activities?

Email: __ Listservs & Newsgroups: __ CLIO-Plus: __

Text/Image/Numeric Data Sources on WWW: __ Other WWW:__

O. What is your present primary relationship to Columbia?

[Undergraduate_____] If "Other", please specify:

P. What is your primary discipline?

[Undetermined_____] If "Other", please specify:

We initially launched the Web questionnaire in two parts. The reader was given the initial part, which asked questions that could be answered before he used the book, e.g., about his reason for using the book, timing of need for the material he was seeking, and his status, when he clicked on the title of the book. He was not required to complete it in order to move on to the book, but it was easy to respond at least in part. The scholar was asked to click on the button taking him to the second part when he finished his session with the book; it asked various

questions about how he felt about the online format. We could not force the user to go to the second questionnaire and hardly anyone did. At the same time, the online book designers found working with two questionnaires to be difficult.

In preparation for the Fall 1996 semester, we switched to a single questionnaire format in which the scholar must choose to go to the questionnaire after he uses the book. Response rates have been poor with fewer than ten questionnaires submitted in any week and many of those responses incomplete.

Data captured from the questionnaires are processed (using Unix utilities) to produce a standard data file for input into SAS or SPSS. Findings from the most recent data are summarized below.

6.2 Early Results from CWeb Survey

6.2.1 CWeb Survey Responses by Online Text Used

From late September 1996 through early June 1997, we received 85 responses to the CWeb questionnaire.

Table 37. CWeb Online Survey Responses by Online Text Used, September 1996 - June 1997

Online Text Used	Count	% of Total
Oxford English Dictionary	64	75%
Granger's Index to Poetry	1	1%
Garland Reference Works	2	2%
Past Masters Texts	8	9%
CUP Social Work	7	8%
Other CUP Monographs	0	0%
OUP Monographs	2	2%

The OED is both the most used of the online books and the one for which the most survey responses were returned.

Given *The OED*'s overwhelming presence in the responses, this analysis is largely one of reactions to the online *OED*. In a few cases the analysis distinguishes between *The OED* and all of the other texts.

6.2.2 CWeb Survey: Primary Project for Using Book

The questionnaire asked the scholar to select the *best description of that work or project for which you are using this book* and gave a choice of five options. The distribution of responses was:

Table 38. CWeb Online Survey Responses by Work Involved, September 1996 -

Table 38. CWeb Online Survey Responses by Work Involved, September 1996 - June 1997

Work/Project	% of Responses
Research project	46%
Class preparation	28%
Current awareness	6%
Other University activity	5%
Other	15%

Research projects are the major purpose for using the online books.

6.2.3 CWeb Survey: Ways of Using Book

The questionnaire asks *What did you do with this book on this occasion? (Select all applicable uses.)* It offers different reasons for the monographs and for the various reference books.

For the *OED* responses, the distribution of book uses was:

Table 39. CWeb Online Survey Responses: Uses of *The OED* , September 1996 - June 1997

Use	% of OED Responses
Definitions	94%
Etymology	43%
Pronunciation	14%
History of words	44%
Examples of Use	36%
Citations for authors	13%
Citations for eras	21%

For all the other books, the distribution of uses was:

Table 40. CWeb Online Survey Responses: Uses of Other Books, September 1996 - June 1997

Use	% of Other Responses
Looked up something	32%
Searched for something	47%
Looked at citations	16%

Looked at table of contents &/or index	11%
Looked at introduction &/or conclusions	26%
Looked at graphics	16%
Read part of the book	68%

Those who reported that they used the online book by reading part of it were asked how much they read. Responses were distributed as follows:

Less than 10%	59%
10-30%	18%
Over 30%	23%

The majority of these online book users read less than 10 percent, say one chapter, online.

6.2.4 CWeb Survey: Forms of This Book Ever Used

The questionnaire asks *Which forms of this book have you ever used?* and offers the scholar nine options. Responses were distributed as follows:

Table 41. CWeb Online Survey Responses: Forms of the Book Ever Used, September 1996 - June 1997

Forms Ever Used	% of OED Responses (N=60)	% of Other Responses (N=17)
Online copy in library	43%	12%
Online copy elsewhere	53%	59%
Printout from online copy	25%	29%
Download from online	13%	12%
Library paper copy	60%	12%
My own paper copy	30%	24%
Colleague's paper copy	13%	12%
Photocopy from paper copy	10%	0%
CD-ROM	12%	6%

For *The OED, paper copy in the library* received the most mentions with *online copy elsewhere* coming in a close second. For the other books, *online copy elsewhere* was the dominant response.

6.2.5 CWeb Survey: Preferred Form of This Book

The questionnaire asked *If you have used this book in more than one way, which one do you prefer overall?* The same choices were offered as above. Responses (56 for *The OED* and 17 for the other books) were distributed as follows:

Table 42. CWeb Online Survey Responses: Preferred Book Form, September 1996 - June 1997

Preferred Form	% of OED Responses	% of Other Responses
Online copy in library	21%	12%
Online copy elsewhere	46%	24%
Printout from online copy	12%	24%
Download from online	2%	6%
Library paper copy	9%	0%
My own paper copy	5%	35%
Colleague's paper copy	0%	0%
Photocopy from paper copy	0%	0%
CD-ROM	4%	0%

Online copy used outside the library is far the preferred book form for *The OED* with more than twice the votes as the next most preferred form, *online copy used in the library*. *Printout from online copy* ranked third. The various forms of using the online *OED* received over 80 percent of the preferences votes.

The responses for the other books are also revealing. Just over a third of respondents preferred *my own paper copy*. Given the attributes ranked as important - always available and easily annotated, this is a logical top runner for non-reference books. However, various forms of using the online book received all the other votes of this small sample of users of the online book collection.

6.2.6 CWeb Survey: Reasons for Preference

The questionnaire asked *Referring to the way of using this book that you prefer, why do you like it best? (Select all that apply.)* Responses were distributed among the options offered as follows:

Table 43. CWeb Online Survey Responses: Reasons for Book Form Preference, September 1996 - June 1997

Reasons for Preference	% of OED Responses	% of Other Responses
Less costly	41%	60%
Easy to get to	71%	75%
Easy to read	49%	40%
Always available	66%	75%
Easy to search	73%	40%
Easy to copy	44%	30%
Easy to take notes/annotate	20%	30%
Other reasons	8%	5%

Easy to get to, which had no mentions in the in-class survey, was the most popular response given in this survey. In part this reflects the heavy presence of *The OED* in this survey, but this reason for the preference also tied with a*lways available* for the other responses involving books other than *The OED*.

6.2.7 CWeb Survey: Preferred Format and Reasons for Preference

Looking at all the responses, the top reasons for each format being preferred were:

Table 44. CWeb Online Survey Responses: Preferred Book Form and Key Reasons for Preference, September 1996 - June 1997

Preferred Form	Key Reasons for Form Preference	
Online copy in library	Easy to get to	Easy to search
Online copy elsewhere	Easy to get to	Always available
Printout from online copy	Always available	Less costly Easy to get to Easy to copy
Download from online	One mention for all but *Easy to read*	
Library paper copy	Easy to get to Always available	Easy to read Easy to search
My own paper copy	Always available	Easy to read
Colleague's paper copy	Not preferred	
Photocopy from paper copy	Not preferred	
CD-ROM	Easy to search	Easy to copy

The popularity of *easy to get to* is consistent with the preference for *online copy used outside the library* as long as the respondent has easy access to a computer with a Web browser.

6.2.8 CWeb Survey: Frequency of Use in Past Three Months

The questionnaire asked On how many occasions (including this one) have you used this book in any format during the last 3 months? The 79 responses were distributed as:

Table 45. CWeb Online Survey Responses: Frequency of Use of This Book in Past three Months, September 1996 - June 1997

Number of Occasions	Number of Responses	% of Responses
0	6	8%
1	16	20%
2	12	15%
3-4	10	13%
5-6	10	13%
7-8	4	5%
10-12	9	11%
15-19	3	4%
20-35	6	8%
50-99	3	4%

Those responding 'zero' were not following the directions to the question and presumably meant that this was their first occasion to use this book in this period. The mean was 8.7 occasions and the median 3.0 occasions - or an average of about three occasions per month based on the mean or once a month based on the median. It may be that heavy users of online books are more likely to notice our questionnaire and ultimately to respond and, hence, to be over-represented in this sample. However, the question asks about use in all formats.

6.2.9 CWeb Survey: Total Usage in Minutes in Past Three Months

The questionnaire asked *For approximately how many minutes in total have you used this book during the last 3 months?* The 79 responses were distributed as:

Table 46. CWeb Online Survey Responses: Total Usage of This Book In Minutes in Past Three Months, September 1996 - June 1997

Minutes	Number of Responses	% of Responses
0	2	2%
1-9	13	16%
10-12	16	20%

10-12	16	20%
15-18	11	14%
20-24	10	13%
25-36	15	19%
45-60	10	13%
80-90	2	2%

Again, those responding 'zero' were not following the directions to the question and presumably meant that they had not spent any time with this book previously in this period. The mean was 22 minutes and the median 15 minutes. These are not great amounts of time for using a monograph but they are substantial for using a dictionary.

6.2.10 CWeb Survey: Frequency of Use of Any Online Book in Past Year

The questionnaire asked *About how many times in the past 12 months have you used an online book, i.e., a monograph or reference book available on CNet or another computer network?* The 75 responses were distributed as:

Table 47. CWeb Online Survey Responses: Total Usage of Online Books In Past Year, September 1996 - June 1997

Number of Times	Number of Responses	% of Responses
0	10	13%
1-2	18	24%
3-6	15	20%
10-16	8	11%
20-25	9	12%
30-50	12	16%
75-99	3	4%

The mean was 15 uses in the past year and the median five uses. This sample is most likely not representative of all users of the online books, let alone of the Columbia community.

6.2.11 CWeb Survey: Effect of Online Books on Scholarly Work

Two key questions asked on all of our questionnaires, other than those distributed in class, seek to determine the effect of online books on scholarly work.

- *In doing the type of work for which you used this book, do paper books or online books help you be more productive?*
- *Do you find that you are able to do work of higher quality when you use paper books or online books?*

The questionnaire offers a range of seven responses from *Much greater productivity (quality) with paper* through *No Difference* to *Much greater productivity (quality) with online* plus *Cannot Say.*

6.2.11.1 CWeb Online Survey: Productivity, Book Type and Format

As the following table shows, many *OED* users felt that they are more productive using the online *OED* works while only a modest number of the users of the other online books felt that they are more productive using online books.

Table 48. CWeb Online Survey: *In doing the type of work for which you used this book, do paper books or online books help you be more productive*? by Book, September 1996 - June 1997

Response	OED (N=64)	All Other Books (N=21)
Cannot Say	12%	10%
Paper Much Greater	16%	24%
Paper Greater	8%	14%
Paper Somewhat Greater	12%	14%
No Difference	2%	19%
Online Somewhat Greater	17%	5%
Online Greater	17%	5%
Online Much Greater	16%	10%
Note: Detail may not sum to 100% due to rounding.		

Of the group of 64 users of *The OED*, 50 percent believed that they were more productive with *online books* and 36 percent believed that they were more productive with *print books*. Only one respondent thought there was no difference and eight responded *cannot say*. The 21 users of the other books did not share this feeling. Only 19 percent believed that they were more productive with *online books* and 48 percent believed that they were more productive with *print books*. However, another 19 percent noted *no difference* in productivity and ten percent responded *cannot say*.

6.2.11.2 CWeb Online Survey: Work Quality, Book Format and Type

As the following table shows, the distribution of responses to the second question about the quality of work when using print and online books supports the print format in general, although many respondents found no difference in their work quality with the two formats.

Table 49. CWeb Online Survey: *Do you find that you are able to do work of higher quality when you use paper books or online books*? by Book, September 1996 - June 1997

Response	OED (N=64)	All Other Books (N=21)
Cannot Say	16%	5%
Paper Much Greater	16%	24%
Paper Greater	6%	14%
Paper Somewhat Greater	16%	14%
No Difference	31%	29%
Online Somewhat Greater	2%	0%
Online Greater	8%	0%
Online Much Greater	6%	14%
Note: Detail may not sum to 100% due to rounding.		

For *The OED*, 37 percent supported print books, 16 percent backed online books, and 31 percent perceived no difference in work quality. For all other books, 52 percent voted for print books, 14 percent for online books, and 29 percent perceived no difference in quality.

These responses are somewhat puzzling as the reference book most used online is *The OED* and the features of the CWeb version provide as much utility if not more than the print version (with the exception of being able to view neighboring entries at a glance).

Cross-tabulation of these two questions finds considerable correlation in the responses - those who supported the paper version for productivity tended to support it for quality as well.

Table 50. CWeb Online Survey: Quality and Productivity, September 1996 - June 1997

	Quality of Work			
Productivity	**Cannot Say**	**Better Paper**	**No Difference**	**Better Online**
Cannot Say	8	0	2	0
Better Paper	3	27	5	1
No Difference	0	1	4	0
Better Online	0	9	15	12

Almost a third of the 85 respondents ranked paper books as yielding both greater productivity and greater quality, while only one person ranked paper books better for productivity and online books better for quality. About 14 percent ranked online books better on both scores, while about ten percent ranked online books better for productivity but paper books better for quality.

6.2.12 CWeb Online Survey: Columbia Cohort of Respondents

The questionnaire asked a respondent to select one of several statuses offered as that which

represented his present primary relationship to Columbia University. The responses were distributed as follows.

Table 51. CWeb Online Survey: Respondent's Columbia Status, September 1996 - June 1997

Columbia Status	Number of Responses	% of Responses
Undergraduate	49	58%
Graduate Student	20	24%
Faculty	6	7%
Non-Faculty Officer	3	4%
Staff	5	6%
Special Student	1	1%
Other	1	1%

Of the 85 respondents whose questionnaires were analyzed above, 58 percent were undergraduates and 24 percent graduate students. This is consistent with the server data on *OED* user status, which identified 58 percent of users and 55 percent of hits with undergraduates, and six percent of users and 11 percent of hits with graduate students.

6.2.13 CWeb Online Survey: Discipline of Respondents

The questionnaire asked a respondent to select one of 16 disciplines (including *Other*) as that which defined his scholarly focus. The 85 responses were distributed as follows.

Table 52. CWeb Online Survey: Respondent's Discipline, September 1996 - June 1997

Discipline	Number of Responses	% of Responses
Undetermined	44	52%
Architecture	1	1%
Art	3	4%
Business	2	2%
Computer Science	9	11%
Engineering	4	5%
Health Sciences	6	7%
History	2	2%
Humanities	14	16%

As the table shows, as might be expected, many of the undergraduate respondents have not yet selected a discipline. There were no representatives of seven possible disciplines, including

major ones such as Social Work, Social Sciences, and Natural and Physical Sciences, in the responses.

6.2.14 Online Survey: Place in Project

We will need to explore the responses to this survey closely now and as we track it in the future and utilize our findings in structuring the interviews we undertake in the months ahead. It would be surprising if we do not see a shift in responses as our collection grows and as users have an opportunity for continuing use. Of course, we may have difficulty eliciting repeat responses to our questionnaire from the same individuals. However, perhaps some repeat users who have not completed the questionnaire will do so in the future. If necessary, we will be more aggressive in seeking feedback from users, e.g., by sending them questionnaires or interview requests in email or by telephone.

We are exploring various methods to increase our response rate. From March 15 to May 31, 1997, there were 42 hits on the survey button; 14 on the *OED* survey and 28 on the monograph survey. In this period, 280 people used the online book collection; thus, only 15 percent of them went to the survey during any of their sessions with the collection. During this period, 22 completed surveys were submitted, for a 52 percent return on surveys viewed. We are hopeful that introducing a frames design to our books, with the survey button on the frame along with navigational and search buttons, will remind users about the survey and encourage them to go to it and complete it. Clearly, getting that initial interest is critical to getting users to assist with our research by completing the questionnaire.

Other options we are exploring include breaking up the online questionnaire so that users confront only a screen full of questions (i.e., each respondent would answer only a subset of our questions), however, the non-response problem is one of getting the users of the online books to click on the questionnaire button much more than one of getting them to complete the questionnaire once they have done that. We are exploring changing our incentives, such as by instituting an improved lottery, but changes to date have not had a notable impact.

6.3 User Comments

We are gathering more contextual feedback from users through follow-up questions on email and through personal interviews. We have been using this feedback in making design decisions and we will be pulling it together more systematically over the course of this semester and early next summer.

Comments on questionnaires help us keep grounded in our work. The following example, quoted in full, shows remarkable insight into the complexities of assessing impact in a rapidly changing environment. It was anonymous.

Exhibit 6. An Extended Comment

Your questions show a decided bias that attempts to lead the technology-shy into giving a negative review. You already know that this is a better method of text distribution! Why is this survey even here? There are only 2 advantages that books could possibly have over online texts. 1. They are easier to read. That issue will shortly become moot as people simply become accustomed to reading the texts on a screen rather than on a page. 2. They are portable. Online sources are infinitely more portable in an abstract sense since they can be distributed swiftly all over the world. Physically, every computer terminal is a potential source. It won't necessitate everyone getting a laptop to make e-texts as portable as physical books, although that is happening. In sum, get with it! What the [expletive deleted] are you doing? You KNOW that even if people aren't using this resource fervently now, they will in 2-3 years! Get off your butts and start putting more texts online instead of writing inane, technophobic, leading polls.

Other, more courteous responses call attention to the need for excellent search and browsing capabilities in online books. Some were praising the current design for its provision of these capabilities. Others were suggesting that better capabilities were needed. Users would particularly like to see more analytical tools in the CWeb *OED*. Analysis of these comments along with those made in the ongoing interviewing of users will come in the next stage of our reporting.

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Scholarly Communication and Technology

Conference Organized by The Andrew W. Mellon Foundation

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Session #4 Patterns of Usage

Online Books at Columbia: Measurement and Early Results on Use, Satisfaction, and Effect

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7. BEHAVIORAL FACTORS

7.1 Access to Networked Computer

As noted earlier (see section 4.2), in all of the Project's surveys the following question is asked: *Is there a computer (in the library or elsewhere) attached to the campus network (directly or by modem) that you can use whenever you want?* Our hypothesis is that the easier a Columbia scholar's access to the campus network and materials on CNet and CWeb the more likely he is to adopt online resources, including the collection of online books. In addition, we want to track this measure over time to see how it changes. The responses to this question in the in-class and CWeb online surveys are summarized here.

An overwhelming majority (80 or 94 percent) of the 85 respondents to the CWeb online survey responded to this question in the affirmative.

The students responding to the in-class survey did not see themselves as having such easy access to a networked computer. Of the 239 who responded to this question, 68 percent answered in the affirmative. The percent responding in the affirmative for the different types of classes was:

Table 53. In-Class Surveys: Ready Access to Networked Computer: Whole Sample Spring 1997

Class Type	N	% Responding *Yes*
Contemporary Civilization	102	82%
Graduate Political Science	5	20%
Undergraduate Political Science	12	75%
Social Work Masters Students	104	65%
Total Respondents	239	68%

As in the on-site library survey, undergraduates claim greater access to networked computers than masters students do.

Table 54. In-Class Survey: Preferred Method of Reading This Assignment and Access to Networked Computer: Whole Sample Spring 1997

Preferred Method of Reading Assignment	Access to Networked Computer?	
	Yes (N=62)	No (N=23)
Own Copy	66%	61%
Friend's Copy	6%	9%
Library Copy	6%	4%
Photocopy	6%	13%
Reading it directly from CWeb	11%	0%
JAKE printout of text	8%	4%
Printout using non-JAKE printer	5%	9%
Download of online text to disk & reading away from CWeb	2%	0%

As the above table shows, comparing students' perceived access to networked computers and their preferred book form reveals that such access does not lead students to preferring online books. Given the stated reasons for their preferences, this is logical. Over 66 percent of those responding Yes to this question preferred their own copy of a book while only 61 percent of those responding *No* did. Photocopy was the preferred form for 13 percent of those responding *No*, but for only six percent of those responding *Yes*. This combination of responses suggests that an economic element is at work here. Those who cannot afford their own computers may also prefer not to buy books for classes.

7.2 Time In Online Activities

Based on study of the data, we have settled on collection of information on the amount of time spent per week in various online activities to represent the behavior of the users. (This question was discussed earlier in the context of the on-site survey of library users.) The balance among the various online activities will vary with discipline, and with the position of the user. In the versions of the questionnaire in use since last spring for books in print and online format, the data have been gathered by the following question.

About how many hours per week do you spend in each of the following online activities?

Email: __ Listservs & Newsgroups: __ CLIO-Plus: __

Text/Image/Numeric Data Sources on WWW: __ Other WWW:__

Since these activities are all measured in hours per week, we can sum them to produce a single simple measure of the level of *online activity* (as we asked the question in the on-site library user survey). The results are instructive. We have prepared tables showing the percent distribution of respondents by number of hours spent online, in all activities, for three different groups: users of online books, users of the *OED* in paper format, and students surveyed in class. (Table 5 gives equivalent data for the respondents to the March 1997 onsite survey of library users.)

7.2.1 Responses to CWeb Online Survey

As the following table shows, for the 80 users of online books, the mean is 14.8 hours spent online per week and the median is ten hours per week online. The greatest number of hours online reported was 71.

Table 55. CWeb Online Survey: Weekly Hours In Online Activities, September 1996 - June 1997

Hours/Week in Online Activities	Number of Respondents	% of Respondents
Less than 2	2	2%
2-4	11	14%
4-6	7	9%
6-8	11	14%
8-10	10	12%
10-12	10	12%
12-14	3	4%
More than 14	26	32%

Breaking down the sample into those who claimed easy access to a networked computer (94%) and those who did not, gives means of 15 and 12.3 weekly hours online, respectively. This is not significant because of the small sample size.

7.2.2 Responses to Questionnaire with Paper *OED*

As the following table shows, for users of the paper format, online activity is lower with a mean of just 3.9 hours.

Table 56. Weekly Hours In Online Activities for 11 Respondents to Paper Questionnaire on Use of OED, 1996 - Percent of Respondents

Hours/Week In Online Activities	% of Respondents
1-2	36%
2-4	36%
4-6	9%
6-8	9%
Extremes (Max. 17)	9%
Mean	3.9

This set of findings on time in online activities by type of resource being used supports a hypothesis that users of online books will be people who spend significantly more hours per week in online activities than do users of the paper versions. As we reported earlier, onsite library users reporting on their use of online resources in the average week in Winter 1997 had a mean of 5.8 hours.

7.2.3 Responses to In-Class Questionnaire, Fall 1996 and Spring 1997

The in-class questionnaire also asked about weekly hours in online activities. (See Exhibit 4.) Responses were distributed as follows.

Table 57. In-Class Surveys: Weekly Hours In Online Activities: Whole Sample Fall 1996 and Spring 1997

Hours/Week	Fall 1996 (N=398)	Spring 1997 (N=217)
1-2	26%	34%
2-4	30%	27%
4-6	19%	13%
6-8	8%	10%
8-10	5%	3%
10-12	4%	3%
12-14	1%	3%
Extremes	8%	6%
Mean	5.2	5.3
Maximum Hours	95	50

Breaking this group down by type of class, we find:

Table 58. In-Class Surveys: Mean Weekly Hours In Online Activities By Class Type: Fall 1996 and Spring 1997

Class Type	Fall 1996		Spring 1997	
	N	Mean	N	Mean
Contemporary Civilization	281	5.1	104	5.8
Political Science	61	4.3	16	6.9
Social Work	56	6.7	97	4.6

The differences among these groups of students and between the two semesters are not statistically significant.

Breaking the Spring 1997 responses down by their reported access to networked computers gives the following table:

Table 59. In-Class Surveys: Weekly Hours In Online Activities By Access to Networked Computer: Spring 1997

Hours/Week	Easy Access to Networked Computer?	
	Yes (N=154)	No (N=55)
1-2	27%	53%
2-4	28%	24%
4-6	16%	7%
6-8	14%	0%
8-10	3%	6%
10-12	3%	6%
12-14	4%	0%
More than 14	7%	6%
Note: Detail may not sum to 100% due to rounding.		

Students claiming easy access to a networked computer spend more time online than those who do not feel that they have easy access. About 31 percent of the former group spend at least six hours a week online while only 18 percent of the latter group do.

In summary, the students surveyed in class have slightly greater uses of online activities than the users of the paper *OED*, surveyed in the library, but about 10 percent less than library users overall in March 1996 and 1997. Students with easy access to a computer are even greater users of online resources. Together these findings suggest that we are at the beginning edge of the transition to electronic use, and makes us confident that we will be able to map out the complete change in attitudes and behavior as availability and accessibility of online books changes the environment at Columbia University.

One of the more interesting issues to be tracked over the span of this project is whether the

center of gravity of user behavior shifts. That is, will we find in two years that the *light* users of online services are spending more hours per week online than are the average users of today.

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Session #4 Patterns of Usage

Online Books at Columbia: Measurement and Early Results on Use, Satisfaction, and Effect

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8. CONCLUSIONS

We find ourselves at the beginning of a complex project, which we have planned in considerable detail. We are not as far along as we would have hoped, principally because it is much more difficult to bring books into online form than everyone has anticipated. In addition, the explosive growth of Web browser technology creates continuous pressure to improve the functionality of the books that go online. We are in the position of surgeons who must keep a patient active, while making drastic changes to that patient's anatomy. We believe that our procedures for surveying the users and analyzing their responses will help us to do that. We hope, in addition, that the results will prove useful to others who wish to understand or to replicate the transitions being pioneered at Columbia.

We look forward to suggestions and comments from others who are approaching this problem from other perspectives.

Appendix 1. Contemporary Books In the Online Collection

Publisher/Title	Author	Subject	Print Status	Month Public	No. of Chapt. or Essays	No. Of Pages	Price - Hard ($)	Price - Soft ($)
Columbia University Press								
Great Paleozoic Crisis	Erwin	Earth Science	Circulati	6/97	10/c	327	57.00	27.50
Seismosaurus: The Earth Shaker	Gillette	Earth Science	Circulati	10/96	11c	205	39.95	
Invasions of the Land	Gordon	Earth Science	Circulati	6/97	10c	312	65.00	17.50
Folding of Viscous Layers*	Johnson	Earth Science	Circulating			461		
Dinosaur Tracks and Other Fossil Footprints*	Lockley	Earth Science	Circulating			338		
Sedimentographica: Photographic Atlas	Ricci-Lu	Earth Science	Circulati	1/97	8c	255	45.00	
Development of Biological Systematics*	Stevens	Earth Science	Circulating			616		
Consuming Subjects*	Kowales	Economic History	Circulating			185	39.50	15.50
Jordan's Inter-Arab Relations	Brand	Internat'l Relations	Reserves	3/97	8c	350	45.00	
Managing Indonesia	Bresnan	Internat'l Relations	Reserves	3/97	10c	375	55.00	19.50
Logic of Anarchy*	Buzan	Internat'l Relations	Reserves			267		

Hemmed In: Responses to Africa's...	Callagy	Internat'l Relations	Reserves	3/97	13e	573	52.50	19.50
China's Road to the Korean War*	Chen	Internat'l Relations	Circulating			339	37.50	17.50
Culture of National Security*	Katzenst	Internat'l Relations	Reserves			562	50.00	17.50
International Relations Theory & the End of the Cold War*	Lebow	Internat'l Relations	Circulating			2925	45.00	17.50
The Cold War on the Periphery*	McMaho	Internat'l Relations	Circulating			431	34.50	17.50
Losing Control: Sovereignty...*	Sassen	Internat'l Relations	Circulating			149	24.95	
Gender In International Relations	Tickner	Internat'l Relations	Reserves Circulati	11/96	5c	180	30.00	15.50
The Inhuman Race*	Cassuto	Literary Criticism	Circulating			289	49.50	17.50
Rethinking Class: Literary Studies...*	Dimock	Literary Criticism	Circulating			285	49.50	16.50
The Blue-Eyed Tarokaja*	Keene	Literary Criticism	Circulating			210		24.50
Ecological Literary Criticism*	Kroeber	Literary Criticism	Circulating			185	49.50	16.50
Parables of Possibility*	Martin	Literary Criticism	Circulating			263	27.50	
The Text and the Voice*	Portelli	Literary Criticism	Circulating			415		
At Emerson's Tomb*	Rowe	Literary Criticism	Circulating			320	49.50	16.50
Extraordinary Bodies: Figuring Physical...*	Thomson	Literary Criticism	Circulating			200	45.00	16.50
What Else But Love? The Ordeal of Race...*	Weinstei	Literary Criticism	Circulating			237	42.00	15.50
Columbia Granger's Index to Poetry	Granger	Poetry	Ref. Desk	10/94	N/A	231		
Ozone Discourses	Liftin	Political Science	Reserves	1/97	6c	257		16.50

Concise Columbia Electronic Encyclopedia		Reference	Ref. Desk	3/91	N/A	943		49.95
Hierarchy Theory*	Ahl	Science	Circulating			206	49.50	
Refiguring Life: Metaphors of 20th Century Biology*	Keller	Science	Circulating			134	20.00	16.50
The Molecular Biology of Gaia*	Williams	Science	Circulating			210	45.00	
Sampling the Green World*	Stuessy	Science/ Botany	Circulating			289	49.50	
The Illusion of Love*	Celani	Social Work	Circulating			217	27.50	16.50
Mutual Aid Groups, Vulnerable Populations, & the Life Cycle	Gitterman	Social Work	Reserves	11/96	21e	448	39.50	
Supervision in Social Work	Kadushin	Social Work	Reserves	9/96	10c	597	45.00	
Eating Disorders: New Directions*	Kinoy	Social Work	Circulating			166	42.50	15.00
From Father's Property to Children's Rights*	Mason	Social Work	Circulating			237	40.00	16.00
Handbook of Gerontological Services	Monk	Social Work	Reserves	9/96	25e	694	65.00	
Turning Promises Into Performance	Nathan	Social Work	Circulati	9/96	13c	160	45.00	15.50
Philosophical Foundations of Social Work	Reamer	Social Work	Reserves Circulati	9/96	5c	219	49.50	17.00
Task Strategies: An Empirical Approach	Reid	Social Work	Reserves	9/96	11c	329	37.50	
Experiencing HIV*	Sears	Social Work	Circulating			182	45.00	15.00
Qualitative Research In Social Work	Sherman	Social Work	Reserves	1/97	43e	520	57.50	27.50
The Empowerment Tradition in America*	Simon	Social Work	Circulating			297	49.00	22.50

Garland Publishing

Native American Women	Bataille	Biography	Referenc	1/97	N/A	333		
African American Women	Salem	Biography	Referenc	1/97	N/A	622		
Chaucer Name Dictionary	de Weever	English Literature	Referenc	12/96	N/A	451		
Oxford University Press								
Oxford English Dictionary		Language	Referenc	9/96	N/A	N/A		
Postcards from the Trenches: Negotiating the Space Between Modernism & The First World War**	Booth	Literary Criticism	Circulating			186	35.00	
The Erotics of Talk**	Kaplan	Literary Criticism	Circulating			240?	35.00	16.95
"Littery Man": Mark Twain...	Lowrey	Literary Criticism	Circulati	11/96	4c	177	39.95	
Children's Literature & Critical Theory	May	Literary Criticism	Circulati	11/96	9c	243	29.95	18.95
Poetics of Fascism	Morrison	Literary Criticism	Circulati	10/96	4c	177	39.95	
Novel & Globalization of Culture	Moses	Literary Criticism	Circulati	11/96	4c	240		18.95
Modernism & the Theater of Censorship	Parkes	Literary Criticism	Circulati	6/97	4c	242	45.00	
Romances of the Republic: Women, the Family, & Violence in the Literature of the Early American Nation**	Samuels	Literary Criticism	Circulating			208	39.95	
Majestic Indolence: English Romantic Poetry...	Spiegelm	Literary Criticism	Circulati	1/97	6c	221	49.95	
Making Mortal Choices: Three Exercises in Moral Casuistry**	Bedau	Philosoph	Circulating			123	29.95	13.95

Morality, Normativity & Society	Copp	Philosoph	Circulati	10/97	10c	262	42.00	
Free Public Reason: Making It Up ...	D'Agosti	Philosoph	Circulati	10/96	10c	203	45.00	
Metaphilosophy and Free Will**	Double	Philosoph	Circulating			192?	35.00	
Bangs, Crunches, Whimpers & Shrieks	Earman	Philosoph	Circulati	10/96	8c	257	35.00	
Causation and Persistence: A Theory of Causation**	Ehring	Philosoph	Circulating			191	39.95	
Self Expression: Mind, Morals & Meaning...	Flanagan	Philosoph	Circulati	10/96	12c	222	24.95	
Logic of Reliable Inquiry	Kelly	Philosoph	Circulati	10/96	16c	434	59.00	
Philosophy of Mathematics & Mathematical Practice In the 17th Century	Mancosu	Philosoph	Circulati	10/96	6c	275	60.00	
Moral Dilemmas & Moral Theory**	mason	Philosoph	Circulating			246	45.00	
Autonomous Agents: From Self Control to Autonomy	Mele	Philosoph	Circulati	10/96	13c	371	49.95	
Other Minds: Critical Essays	Nagel	Philosoph	Circulati	10/96	22e	229	26.00	
The Last Word**	Nagel	Philosoph	Circulating			147	19.95	
Law & Truth	Patterson	Philosoph	Circulati	11/96	7c	189	39.95	
Nietzsche's System	Richards	Philosoph	Circulati	10/96	4c	316	35.00	
Freedom & Moral Sentiment	Russel	Philosoph	Circulati	10/96	12c	200	45.00	
Living High and Letting Die**	Unger	Philosoph	Circulating			187	39.95	14.95
The Human Animal**	Weston	Philosoph	not in yet			208?	29.95	
Real Rights	Wellman	Philosoph	Circulati	10/96	8c	279	52.00	

Simon & Schuster

Bond Markets**#	Fabozzi	Business	Reserves			595	72.00
Marketing Management**#	Kotler	Business	Reserves			824	75.00
Statistics for Business & Economics**	Newbold	Business	Reserves			895	61.50
Investments**	Sharpe	Business	Reserves			900	80.00
Financial Market Rates & Flows**	Van Horne	Business	Reserves			338	41.00
Politics & the Media	Davis	Political Science	Reserves	4/97	9c	432	30.00
Public Policy Analysis**	Dunn	Political Science	Reserves			480	
International Politics	Holsti	Political Science	Reserves	1/97	15c	432	32.25

Notes: * Permission has been received, but the book is not yet online. ** Book is not yet online.

A new edition has been issued for which we need the electronic file.

Appendix 2. Format Availability, Winter 1997, and Introduction Date

	Unix w/Patty	CNet - Own format/ Patty	CNet w/Lynx text-based browser	CWeb w/Lynx text-based browser	CWeb w/ graphical browser
Columbia Concise Electronic Encyclopedia.		3/91			
Oxford English Dictionary	8/94	8/94		9/96	9/96
Granger's Index to Poetry			10/94	10/94	10/94
Chaucer Name Dictionary			12/96	12/96	12/96
Native American Women			2/97	1/97	1/97
African American Women			2/97	2/97	2/97
All other books				1995-1997	1995-1997

- *Unix access* allows the user to simple type in a command (e.g., *OED*) at the Unix prompt and to go to the resource from there. The Patty 2.0 interface and search engine allows

sophisticated searching. In the Unix mode the user can save a whole entry to a file.

- *ColumbiaNet (CNet)* is a gopher-based Campus Wide Information System (CWIS). Users can *clip* individual screens (which may not encompass a whole entry) and download (file transfer), mail or print them. Some Web documents have been linked to CNet menus via *lynx*, the text-based Web browser. The user then has both lynx and CNet functionality.

- *ColumbiaWeb (CWeb)* is Columbia's main World Wide Web site. LibraryWeb (LWeb) is the Libraries' site within CWeb. Both can be accessed by either a graphical browser or lynx. All graphical browser functionalities are available to the community while using the online books - reading, finding words, printing pages or whole documents, saving to a file, copying and pasting to a word processor document. A lynx user can save an entire Web file to a local file, email it or print it to the screen. Or she can copy and paste portions of a Web file to another document.

Appendix 3. Home Computers: Minimum Specifications Recommended

Specification	5/94 (for student)	12/94	4/95	8/95	11/95
CPU	486	486/66	486DX2/66	75 Mhz Pentium	75 Mhz Pentium (slowest Pentium available)
RAM	4 MB	8 MB	8 MB	8 MB	8 MB
Hard Drive Capacity	100 MB	340 MB	500 MB	750 MB	1 GB
CD-ROM Drive		Double	Double	Quad	Quad
Monitor: Size Capacity	SVGA-compatible		15" 256-color SVGA	17" better	15" 72-Hz
Graphics: Pixels Colors Video RAM	SVGA		640 x 480 256	65,000 1 MB	640 x 480 256 1 MB
Sound: Card Speakers			16-bit Sound Blaster-compatible	Sound Blaster comp. Stereo	16-bit SB-compatible Powered
Modem			14.4 kbps fax modem	14.4 kbps	14.4 kbps fax modem
Price	$1,500	$2,500	$1,800-$2,000	Not Given	About $2,000
Source	**Family PC,** 5/1/94, p. 140+	**PC Magazine**	"Family Shopper Smartcard," **Family PC,** 4/95	Walter S. Mossberg, *Personal Technology*, **Wall Street Journal**, 8/31/95, p. B1	"Multimedia Family PCs: New Minimum System Requirements," & "Family Shopper Smartcard," **Family PC,** 11/17/95

Specification	4/96	4/96	5/96	11/96	4/97
CPU	75 Mhz Pentium	133 Mhz Pentium	120 Mhz Pentium	133 Mhz Pentium (200 Mhz is fastest available)	166 Mhz MMX Pentium (200 Mhz if possible)
RAM	8 MB	16 MB	16 MB	16 MB EDO RAM	16 MB (32 preferable)
Hard Drive Capacity	1 GB	Fast 1.2 GB	1.2 GB	1.2 GB	2.0 GB, more if possible
CD-ROM Drive	Quad	Quad	Quad	6X (up to 12X available)	8X
Monitor: Size	15" 72-Hz	15" (17" better)	17"	15"	17" with maximum .28 mm dot pitch
Graphics: Pixels	640 x 480	64 bit Graphics Accelerator	65,000	Accelerated PCI graphics card w/1 MB RAM	2 MB VRAM
Colors	256				
Video RAM	1 MB		1 MB		
Sound: Card	16-bit SB-compatibl	Not mentioned	16-bit SB-compatibl	16-bit FM music synthesis, SB-compatible	
Speakers	Powered				
Modem	14.4 kbps fax modem	28.8 kbps data/fax modem	28.8 kbps	28.8 kbps	33.5 kbps, upgrade to 56 kbps
Connectors					Pair USB ports
Price	About $2,000	$2,500 or more	$2,000-$2,50	$2,000	Not given
Source	"Family Shopper Smartcard," **Family PC**, April 1996	Bill Howard, "At Home," **PC Magazine**, 4/23/96, p. 300. Min. For "Perfect Home Computer"	Walter S. Mossberg, *Personal Technology*, **Wall Street Journal**, 5/10/96, p. B1	*"The '97 Multimedia Family PC,"* **Family PC**, Dec. 1996 (recd 11/19/96), p. 68.	Walter S. Mossberg, *Personal Technology*, **Wall Street Journal**, 4/9/97, p. B1

Appendix 4. Gateway 2000 Home Computers: System Specifications

Specification	12/94	4/95	5/95	12/95	4/96
Computer Name	P5-60 Family PC (featured in ads)	P5-60 Family PC (featured in ads)	P5-75 Family PC (featured in ads)	P5-100 Family PC (Top Rated, Best Buy)	P5-150
CPU	60 Mhz Pentium	60 Mhz Pentium	75 Mhz Pentium	100 Mhz Pentium	150 Mhz Pentium
RAM	8 MB	8 MB	8 MB	8 MB	16 MB
Hard Drive Capacity	540 MB	540 MB	730 MB	1 GB	1.6 GB
CD-ROM Drive	2x	4x	4x	4x	6x
Monitor: Size	14"	15"	17"	15"	17"
Graphics: Pixels Colors Video RAM	1 MB	1 MB	2 MB	2 MB	2 MB
Sound: Card	16-bit SB-compatibl	16-bit SB-compatibl	16-bit SB-compatibl	16-bit SB-compatible	16-bit SB-compatible
Speakers	Altec Lansing	Altec Lansing	Altec Lansing	Altec Lansing ACS-40	Altec Lansing
Modem	14.4 kbps fax modem	14.4 kbps fax modem	14.4 kbps fax modem	28.8 kbps fax modem	28.8 kbps fax modem
Software Included	MS Works + CD-ROMs	MS Works + CD-ROMs	MS Works + CD-ROMs	MS Works, 20 CD-ROMs	MS Office 95
Price (+ shipping)	$2,099	$2,099	$2,499	$2,149	$2,899
Source	GW2000 ad	GW2000 ad	GW2000 ad	"Multimedia Family PCs: Recommended Systems," **Family PC**, 11/17/95 & GW2000 advertising insert, 12/95	GW2000 ad

Specification	5/96	5/96	10/96	10/96	5/97 & 6/97	5/97
Computer Name	P5-133 Family PC	P5-120 Family PC	P5-166 Family PC (featured in ads)	G6-180 Family PC (featured in ads)	G5-166M (featured in ads)	G5-200M (modified)
CPU	133 Mhz Pentium	120 Mhz Pentium	166 Mhz Pentium	180 Mhz Pentium Pro	166 Mhz MMX Pentium	200 Mhz MMX Pentium
RAM	16 MB	16 MB	16 MB/256 KB Cache	32 MB/256 KB Internal Cache	16 MB/256 KB Internal Cache	16 MB/512 KB Internal Cache
Hard Drive Capacity	1.62 GB	850 MB	2 GB	2 GB	1.6 GB	1.6 GB
CD-ROM Drive	8x	8x	8x	8x	12X	12X
Monitor: Size	17" Vivitron	15" CrystalScan	17" CrystalScan	17" Vivitron	15" CrystalScan	15" CrystalScan
Graphics Video RAM	64 Bit PCI Accelerator w/MPEG Video Scaler 2 MB	64 Bit PCI Accelerator w/MPEG Video Scaler 1 MB	64 Bit PCI Graphics 2 MB	64 Bit PCI Graphics 2 MB	64 Bit PCI Graphics 3-D 2 MB	64 Bit PCI Graphics 3-D 2 MB
Sound: Card Speakers	16-bit SB-compati Altec Lansing ACS-40	16-bit SB-compati Altec Lansing ACS-40	16-bit Gateway Sound, SB-comp. Altec Lansing ACS-40	16-bit Ensoniq Wavetable Altec Lansing ACS-40	16-bit Gateway Sound, SB comp. Altec Lansing ACS-41	16-bit Gateway Sound, SB comp. Altec Lansing ACS-41
Modem	28.8 kbps fax modem	28.8 kbps fax modem	36.3 kbps fax modem w/speakerpl	36.3 kbps fax modem w/speakerpl	Telepath modem w/speakerpl x2 Tech upgradeable	Telepath modem w/speakerphone, x2 Tech upgradeable
Software Included	MS Works + 14 CD-ROMs	MS Works + 14 CD-ROMs	Generations II	Generations II	MS Office 97, Encarta, MMX Tech-Enhanced Software	MS Office 97

Price (+ shipping)	$2,549	$1,999	$2,199	$2,649	5/97: $1,799 6/97: $1,749	$2,064
Source	GW2000 ad, 5/96	GW2000 ad, 5/96	GW2000 ad, 10/96	GW2000 ad, 10/96	GW2000 ads	GW2000 website

Appendix 5. U.S. Household PC & Internet Penetration

(ALL PERCENTAGES)

Year & Source *(so)* for Estimate																				
	2000	*so*	*199*	*so*	*Jan -97*	*so*	*Dec -96*	*so*	*Sep -96*	*so*	*Jan -96*	*so*	*Sep -95*	*so*	*Jun -95*	*so*	*Jan -95*	*so*	*Sep -94*	*so*	*Mar -94*	*so*
HH Penetration PCs	55	8	47	8	37	1	39	8	37	9	35	1	35	9	32	1	31	1	35	9	31	3
					35.6						34	2			36	3	33	2				
											32.6											
First Time Buyers of Home PCs Share of Total Sales Home PCs					32	1					50	1									50	1
Share of Primary HH PCs:																						
Pentium					40%	10					24	2			7	3	4	2				
486					60%	10									40	3						
Windows-based PCs (Share of All HH PCs)					59.6						42.6											
HH Penetration Modems	50	8	42	8			28	8			>50	6			18	1	16	1			12	3
											70	2			20	3	73	2*				
																	44.6					

HH Penetration Online Services	35	8	27	8	17	1	17	4	14	5	11	1,4	6.4	9	9	1			4.5	9	5	3
							15	8	10.9		46	2**			12	3	25	2*				
HH Penetration of Other Internet Access											26	2**										
Adults (>=age 16) using Internet							~25	7			<10	7										
HH Penetration CD-ROMs											70	2			15	3						
											83	2*					55	2*				

NOTES:

* Percentage of new computers purchased in previous year.

** Percentage of modem owners subscribing to an online service.

SOURCES:

1. Odyssey Ventures. Jared Sandberg, "PC Makers' Push Into More Homes May Be Faltering," Wall Street Journal, March 6, 1997

2. Software Publishers Association Surveys (Telephone survey, about 500 adults)

3. Times Mirror Surveys (Telephone survey, about 3,600 adults)

4. Electronic Information Report, *1996 Online Subscriber Survey*

5. PC-Meter, Use of Internet Access Service in Last Month, reported by Reuters in clari-news

6. NPD Group, Inc., http://www.npd.com/meterpr4.htm, "Latest NPD Survey Finds World Wide Web Access From Homes Grew Fourfold in Second Half of 1995" Report on survey of sample of 44,800 homes.

7. Nielsen Media Research survey for CommerceNet, Julia Angwin, "Internet Usage Doubles in a Year, San Francisco Chronicle, March 13, 1997

8. Jupiter Communications, http://www.jup.com/Jupiter/release/jan97/consumer.shtml, January 6, 1997 "New Devices and Technologies Will Drive Net Into 36 Million Homes by 2000"

9. INTECO Corp., http://www.inteco.com/pu961031.html, "Percent of HH with PCs, Internet Access: 1993 to 1996

10. PC-Meter, "Pentium, Windows 95 in Minority of Home Installs, According to New PC Meter Reports," July 1, 1997 Press Release from PC-Meter. PC Meter panel consists of 10,000 PC-owning households in the U.S. Note: Value given as share of 486 processors is actually all sub-Pentium PC processors, so includes 286s and 386s as well. Report also notes that 47 percent of household PCs now have Windows 95.

Appendix 6. Concise Columbia Electronic Encyclopedia Sessions, 1994 - 1997: CNet

	Number of Sessions				% Change:		
Month	**1994**	**1995**	**1996**	**1997**	**'94 to '95**	**'95 to '96**	**'96 to '97**
Jan.	1,186	993	645	224	-16%	-35%	-77%
Feb.	1,645	1,342	991	341	-18%	-26%	-66%
Mar.	1,529	1,508	997	394	-1%	-34%	-60%
April	1,551	1,335	896	250	-14%	-33%	-72%
May	1,042	757	458	197	-27%	-39%	-57%
June	713	466	326		-35%	-30%	
July	712	475	412		-33%	-13%	
Aug.	708	496	251		-30%	-49%	
Sept.	1,160	761	291		-34%	-62%	
Oct.	1,879	1,251	542		-33%	-57%	
Nov.	1,596	1,029	405		-36%	-61%	
Dec.	1,300	833	300		-36%	-64%	
Total	15,021	13,2416	6,514		-25%	-42%	
Note: July 1995 hits are estimated.							

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Conference Organized by The Andrew W. Mellon Foundation

at Emory University
April 24-25, 1997

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Session #4 Patterns of Usage

Online Books at Columbia: Measurement and Early Results on Use, Satisfaction, and Effect

Carol A. Mandel
Deputy University Librarian
Columbia University

and

Mary C. Summerfield
Coordinator, Online Books Project
Columbia University Libraries

and

Paul Kantor
Consultant

. . . . . .

FOOTNOTES:

[1] The book could be used entirely in an online format or the scholar could choose to acquire a print version of all or part of the book once he had browsed the online version. Alternatively, at least at some point in time and for some forms of books, such as textbooks, an electronic format such as a CD-ROM might be better - for technical, cost or market reasons - than either the online or the print format. Malcolm Getz addressed some of the format issues well in his paper at this conference, *Electronic Publishing in Academia: An Economic Perspective*.

[2] In effect, funds that would have been spent on interlibrary loan activities, i.e., staff and mailing costs, would be redirected to the producers of the scholarly knowledge, thus supporting the production and dissemination of such scholarship.

[3] Detailed background information is provided in the Project's *Analytical Principles and Design* document of December 1995 and in its Annual Report of February 1997. Both are available at http://www.columbia.edu/dlc/olb/.

[4] Ultimately, if online books were to become a regular product of scholarly publishers, the publishers would make the online version a regular output of their production process. This reengineering might or might not lead to a reduction in publishers' production costs, but it would certainly mean that universities would not be faced with the conversion of printers' tapes to HTML.

[5] Software allowing annotation of an electronic document is available, but few people are aware of it. The Project will seek to bring such software to the Columbia community as feasible.

[6] A few reference books were already online. Their design will be discussed shortly.

[7] The SGML mark-up of these texts as provided was inconsistent. A conversion which was expected to be done quickly and nearly automatically was instead a labor intensive, time consuming process, resulting in the delayed provision of the texts on the Web.

[8] Publishers, including Chadwyck-Healey and Oxford, have provided permission for such conversion.

[9] Greater detail is available in the Annual Report. See Appendix 1 for a summary of the online collection with titles, subject matter and location within the Libraries collections of the print copies (reference, regular circulating collection, reserves collection).

[10] Until recently contracts with authors contained no provision for electronic versions of books. Current contracts include such provisions, but royalties are specified as a percentage of revenues derived from sales in electronic format. As there is no price for the materials included in this research effort, the Press needs to obtain permissions for this special use.

[11] Our agreement with Garland requires them to provide HTML-coded files as we do not have funding to undertake conversion for additional publishers. Thus, Garland must assess its manpower and funding availability in determining the books it will provide.

[12] One Oxford file is awaiting conversion.

[13] Two of these books, designed for course use, have gone into new editions since we received the electronic files, so we need to obtain the files for the latest editions before putting these two books online.

[14] See the Annual Report on the Project's Web home page for greater detail.

[15] So far the Project Coordinator has conducted telephone interviews with three authors who refused permission and inquired about their reasons for doing so. Columbia University Press received explanatory comments from several other authors when they refused permission.

[16] Recommendations from satisfied users to their colleagues is always one of the key sources of sampling for new products. However, it is one over which we have least control.

[17] By early Summer 1997, the online Reserves catalog will contain entries for the online versions of books that have been put on reserve for various courses. This should increase usage by students in courses for which a book is assigned reading.

[18] A repeat user of the collection could bookmark any of the pages and return to it with just one step.

[19] *The OED, Granger's Index to Poetry, Chaucer Name Dictionary, African American Women,* and *Native American Women.*

[20] Consistent with marketing theory, the TULIP project found that usage of online journals was much greater at institutions that had conducted substantial campaigns to build awareness and trial. See Elsevier Science, *TULIP Final Report,* 1996, for details.

[21]. As noted earlier, this document is included on the Web page for the Project. Questionnaires and other research methodologies have been fine-tuned after pretests and early use, but the general concepts remain in place.

[22]. Networked printing that allows such tracking is not yet in place.

[23]. The chart does not have value labels, so these are estimates of the values.

[24]. Source: Amy Cortese, "A Census in Cyberspace," *Business Week Online News Flash*, April 24, 1997

[25]. Data are taken from a fact sheet issued by Columbia's Academic Information Systems in February 1997.

[26]. A question about access to a Web browser has just been added to Project questionnaires.

[27]. In a Spring 1997 interview, a second year social work graduate student who lives in New Jersey said that she has a modem in her home computer but does not use it as direct dialup to Columbia is a long distance call and at $20 a month an ISP account is too expensive. She thought that about half her classmates might not use the Internet from home even if they had computers.

[28]. For the following tables, Web data prior to May 1966 include hits by Project staff, those from May 1966 forward do not. These were excluded as they can be substantial in number as resources are in design phases and do not reflect the scholarly use that we are studying. The earlier statistics cannot be refined to extract such hits. NA: data are not available; NC: total or change is not calculable.

[29]. Analyzing server data is proving more difficult than anticipated as user identification is instituted. In the future, data will be reported on a monthly basis and reports will be issued quarterly.

[30]. This is the common opinion of users who have completed questionnaires and others who were interviewed by email and in person.

[31]. While AcIS has designed a Web version of *The OED* which has various analytical capabilities, unfortunately that version requires more server resources than AcIS can devote to

this single work.

[32] These are host computers with addresses linking them to the dormitory network. See section 4.3.1.2.

[33] Their questionnaires have not been removed since we started tracking these books in January 1997.

[34] A larger collection is available on CD-ROM in the Electronic Text Service. We could not obtain permission to put some of these online.

[35] This type of skewed distribution, or Bradford law, is typical of all types of library collections.

[36] Gitterman's *Mutual Aid Groups* was on reserve for three professors for Fall 1996 semester, but we could not put it in the collection accessible to the Columbia community until November due to delays in obtaining permission from the authors. It was in use in three Social Work classes for Spring 1997 semester.

[37] Community members can request that a book be recalled but that process is not guaranteed to bring the book back to the library and it can take several weeks. Online books are always accessible for such browsing.

[38] This impression was confirmed in a recent interview with a second year social work student. She noted that her home computer has a modem but that she does not have a ISP account or dial-in to Columbia from her home in New Jersey (a long distance call) because of the cost. All of her use of online resources occurs on campus, in the Social Work computer lab or in a library.

[39] Hitherto, IP addresses were the basis of controlling access to the books. The new authorization system was put into effect for *The OED* at the first of April 1997. One means of accessing *The OED*, via a bookmark, is necessarily not included, so *The OED*'s use is still understated. It is not yet in place for *Granger's Index to Poetry* so that resource is not included in this analysis.

[40] We are in the process of obtaining permission from institutions affiliated with Columbia to use the directory information about their users for our research. As a result, we do not have cohort detail on 40 (14%) of the users. Percentages given are with that set of 'unidentified users' as a separate group.

41. We have removed Officers of the Libraries and specific other individuals who are involved in the Project from these data.

42. For use data to show revealed preference, the collection must contain books that would draw users to the collection repeatedly - either books that users want to look at repeatedly or an assortment of books that pulls scholars to the collection for a variety of purposes.

43. The *Past Masters* texts used in the second semester of the course are studied at the beginning of the semester making it difficult to make arrangements with the instructors on time.

44. JAKE is the networked laser printer system maintained by AcIS. Undergraduates and Social Work students have a free 100 page quota for JAKE printing each week.

45. The two Garland reference books are not separated out, even though different uses are offered on their questionnaires.

46. Two changes were instituted in the middle of the Spring semester - a snappier line requesting completion of the survey and a change to a $20 gift certificate from a $20 copycard.

47. All textual documents available on CWeb can be accessed via any graphical interface or via *lynx*. Lynx can be used at the University's Unix prompt with the command *lynx http://www.columbia.edu/...../*

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